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**DOCUMENT-  
IDENTIFIER:** JP 2001181548 A  
**TITLE:** DISPERSION OF COLORED FINE PARTICLE,  
INK FOR INK JET AND INK JET PRINTING  
PROCESS  
**PUBN-DATE:** July 3, 2001

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**APPL-DATE:** December 22, 1999

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**(IPC):** C09D011/00

**ABSTRACT:**

**PROBLEM TO BE SOLVED:** To provide a dispersion of colored fine particles which shows an excellent dispersion stability of colored particles, has no dependence on papers, yields an excellent color development and color tone when printed on a randomly selected paper, shows an excellent water resistance and light resistance and is suitable as an aqueous ink for writing, an aqueous printing ink, an ink for data recording, etc.

**SOLUTION:** The dispersion of colored fine particles comprises colored fine particles containing an oil-soluble dye of formula (I) and an oil-soluble polymer. Preferably, the oil-soluble polymer is a vinyl polymer, and the dissociative groups in the vinyl polymer comprise at least a carboxyl group or a sulfonate group.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[Field of the Invention] Color reproduction of this invention is good in more detail about the ink jet record approach using the ink for ink jets which comes to contain the coloring particle distribution object of the drainage system containing an oil color, and this coloring particle distribution object, and this ink for ink jets, and it is related with the suitable ink for ink jets for the suitable coloring particle distribution object for the water color ink for a note, aquosity printing ink, the ink for information record, etc., thermal \*\* piezo-electricity, electric field, or a sound ink jet method, and the ink-jet record approach.

#### [0002]

[Description of the Prior Art] In recent years, the ink jet printer is widely used for printing of paper, a film, cloth, etc. with the spread of computers not only at office but at the home. As ink for ink jets, although oily ink, water color ink, and solid-state-like ink are known, water color ink is advantageous in respect of manufacture ease, handling nature, odor nature, safety, etc. also in these, and water color ink is in use.

[0003] However, since the water soluble dye which dissolves in the state of a molecule is used, although there is an advantage that transparency and the depth of shade are high, when a water resisting property is bad since a color is water solubility, and it prints in the so-called regular paper, said much of water color ink produces a blot (bleeding), a quality of printed character deteriorates remarkably, or it has the problem that lightfastness is bad.

[0004] Then, the water color ink using a pigment or a disperse dye is proposed in each official report, such as JP,56-157468,A, JP,4-18468,A, 10-110126, and 10-195355, for the purpose which solves said problem. However, in the case of these water color ink, although a water resisting property improves to some extent, it is hard to be referred to as enough, it lacks in the preservation stability of the distributed object of the pigment in this water color ink, or a disperse dye, and has problems -- it is easy to start the blinding in an ink delivery. Moreover, in the case of these water color ink, generally, a hue is not enough, especially the hue of a Magenta component is not enough, and a problem is in the color reproduction nature based on the insufficiency of a color tone.

[0005] On the other hand, the method of making urethane and a polyester distribution object particle carry out the endocyst of the color to each official report of JP,58-45272,A, JP,6-340835,A, 7-268254, 7-268257, and 7-268260 is proposed. However, there is a problem that the color reproduction nature based on the insufficiency of a color tone is not enough, and neither the distributed stability of the color endocyst polymer distribution object when connoting a color to desired concentration nor a water resisting property is also necessarily enough, in these cases.

[0006] On the other hand, improving a color tone is proposed by using the coloring matter which carried out coupling of the aromatic series diamine to pyrazolo triazole for each official report of JP,9-59552,A, 9-111163, 9-255887, and 10-36728. However, in these cases, a color tone changes with the classes of television paper, and there is a problem that a water resisting property is not enough, either.

#### [0007]

[Problem(s) to be Solved by the Invention] This invention solves many problems in said

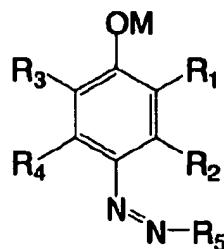
former, and makes it a technical problem to attain the following purposes. Namely, this invention is excellent in the distributed stability of a coloring particle, and does not have a paper dependency. It excels in the color enhancement and the color tone at the time of printing on the paper chosen as arbitration. And a water resisting property, It excels also in lightfastness. The suitable coloring particle distribution object for the water color ink for a note, aquosity printing ink, the ink for information record, etc., Are suitable for thermal \*\* piezo-electricity, electric field, or a sound ink jet method in a list. When printing etc. is performed using a nozzle etc., blinding is not started at this nozzle tip. It aims at offering the ink for ink jets and the ink jet record approach of there being no paper dependency, and excelling in the color enhancement and the color tone at the time of printing on the paper chosen as arbitration, and excelling also in a water resisting property and lightfastness.

[0008]

[Means for Solving the Problem] Said The means for solving a technical problem is as follows. Namely, <1> It is the coloring particle distribution object characterized by coming to contain the coloring particle containing the oil color expressed with the following type (I), and an oil solubility polymer. Formula (I)

[0009]

[Formula 2]  
一般式 (I)



[0010] R1, R2, R3, and R4 among a formula (I), respectively A hydrogen atom, a halogen atom, An alkyl group, a cycloalkyl radical, an aralkyl radical, an aryl group, a heterocycle radical, A cyano group, the hydroxyl, a nitro group, the amino group, an alkylamino radical, An alkoxy group, an aryloxy group, an amide group, an arylamino radical, an ureido radical, A sulfamoyl amino group, an alkylthio group, an aryl thio radical, an alkoxy carbonyl amino radical, A sulfonamide radical, a carbamoyl group, a sulfamoyl group, a sulfonyl group, An alkoxy carbonyl group, a heterocycle oxy-radical, azo, an acyloxy radical, A carbamoyloxy radical, a silyloxy radical, an aryloxy carbonyl group, an aryloxycarbonyl amine radical, an imide radical, a heterocycle thio radical, a sulfinyl group, a phosphoryl group, an acyl group, a carboxyl group, or a sulfonic group is expressed. It may join together mutually and R3 and R4 may form an aromatic series ring or heterocycle. R5 expresses a partial saturation heterocycle radical. M expresses a hydrogen atom, the inorganic base in a dissociation condition, primary amine, the 2nd amine, or the 3rd amine.

<2> A coloring particle is a coloring particle distribution object given in the above <1> with which it comes to distribute an oil color in an oil solubility polymer.

<3> They are the above <1> acquired when a coloring particle makes the organic solvent containing an oil solubility polymer and an oil color emulsify this organic solvent

depending on whether they are adding water and adding this organic solvent underwater, and \*\*\*\*\* and makes it atomize, or a coloring particle distribution object given in <2>.

<4> An oil solubility polymer is a coloring particle distribution object given in either of <3> from the above <1> which is vinyl polymer.

<5> On the other hand, a carboxyl group and a sulfonic group come out at least, and the dissociative radical of vinyl polymer is a coloring particle distribution object given in a certain above <4>.

<6> It is ink for ink jets characterized by coming to contain the coloring particle distribution object of a publication in either of <5> from the above <1>.

<7> It is the ink jet record approach characterized by recording on the above <6> using the ink for ink jets of a publication.

[0011] In this invention, the following means are mentioned further suitably.

<8> The content of the dissociative radical of vinyl polymer is the above <4> which is 0.1 - 3.0 mmol/g, or a coloring particle distribution object given in <5>.

<9> The dissociative radical of vinyl polymer is a coloring particle distribution object given in the above <4> which is a carboxyl group.

[0012]

[Embodiment of the Invention] Hereafter, the coloring particle distribution object of this invention, the ink for ink jets, and the ink jet record approach are explained.

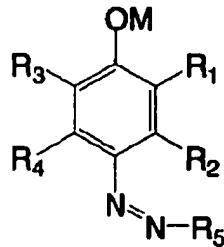
[0013] (Coloring particle distribution object) The coloring particle distribution object of said this invention comes to distribute the coloring particle containing an oil color and an oil solubility polymer to a drainage system medium.

[0014] - Oil color - Said oil color is at least one sort chosen from the compound expressed for example, with the following type (I). Formula (I)

[0015]

[Formula 3]

一般式 (I)



[0016] R1, R2, R3, and R4 among a formula (I), respectively A hydrogen atom, a halogen atom, An alkyl group, a cycloalkyl radical, an aralkyl radical, an aryl group, a heterocycle radical, A cyano group, the hydroxyl, a nitro group, the amino group, an alkylamino radical, An alkoxy group, an aryloxy group, an amide group, an arylamino radical, an ureido radical, A sulfamoyl amino group, an alkylthio group, an aryl thio radical, an alkoxy carbonyl amino radical, A sulfonamide radical, a carbamoyl group, a sulfamoyl group, a sulfonyl group, An alkoxy carbonyl group, a heterocycle oxy-radical, azo, an acyloxy radical, A carbamoyloxy radical, a silyloxy radical, an aryloxy carbonyl group, an aryloxycarbonyl amine radical, an imide radical, a heterocycle thio radical, a sulfinyl group, a phosphoryl group, an acyl group, a carboxyl group, or a sulfonic group

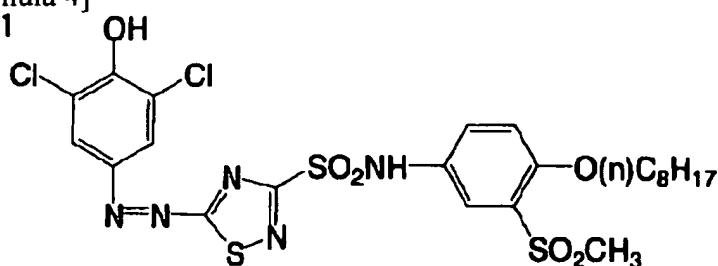
is expressed. It may join together mutually and R3 and R4 may form an aromatic series ring or heterocycle. R5 expresses a partial saturation heterocycle radical. M expresses a hydrogen atom, the inorganic base in a dissociation condition, primary amine, the 2nd amine, or the 3rd amine.

[0017] The examples (I-1-30) of an oil color expressed with said formula (I) below are enumerated. In addition, this invention is not limited to these examples at all.

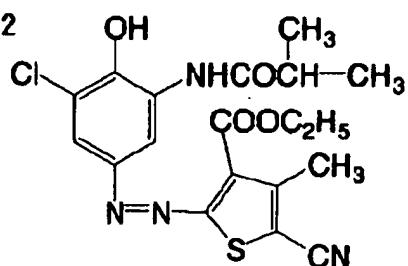
[0018]

[Formula 4]

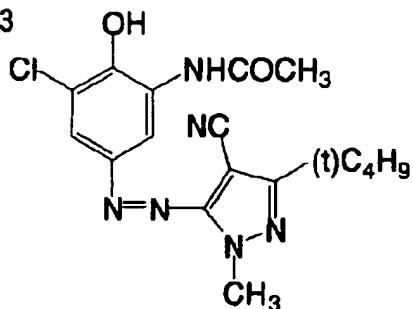
I - 1



I - 2



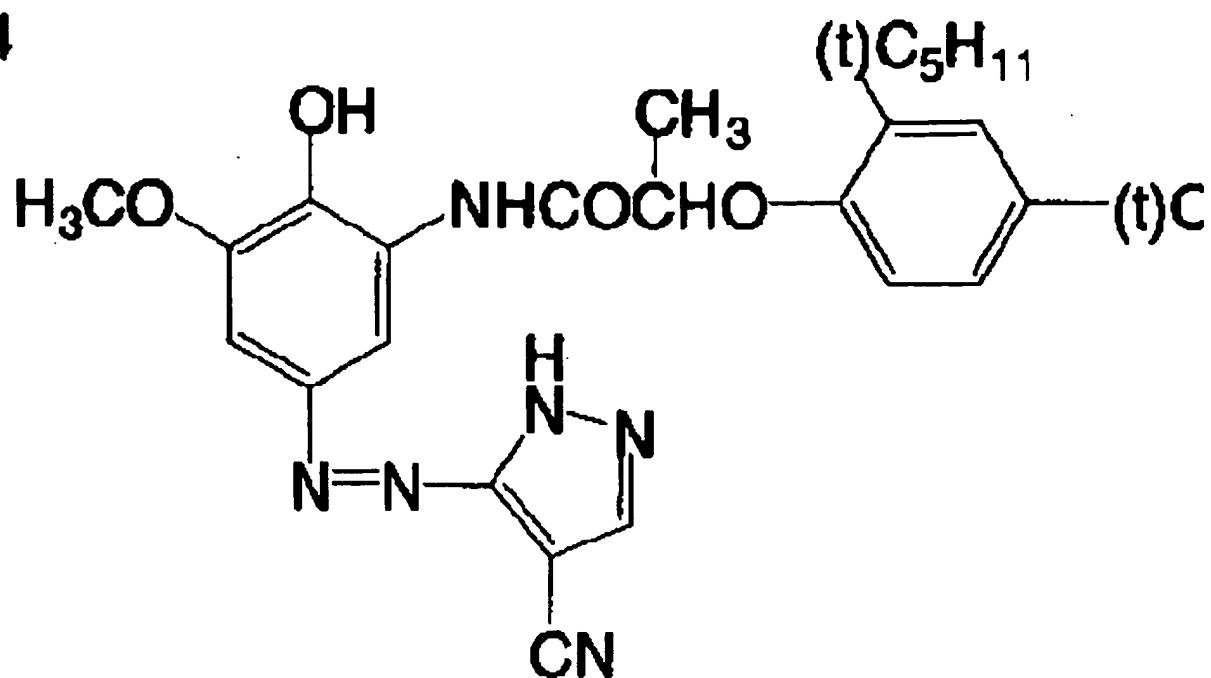
I - 3



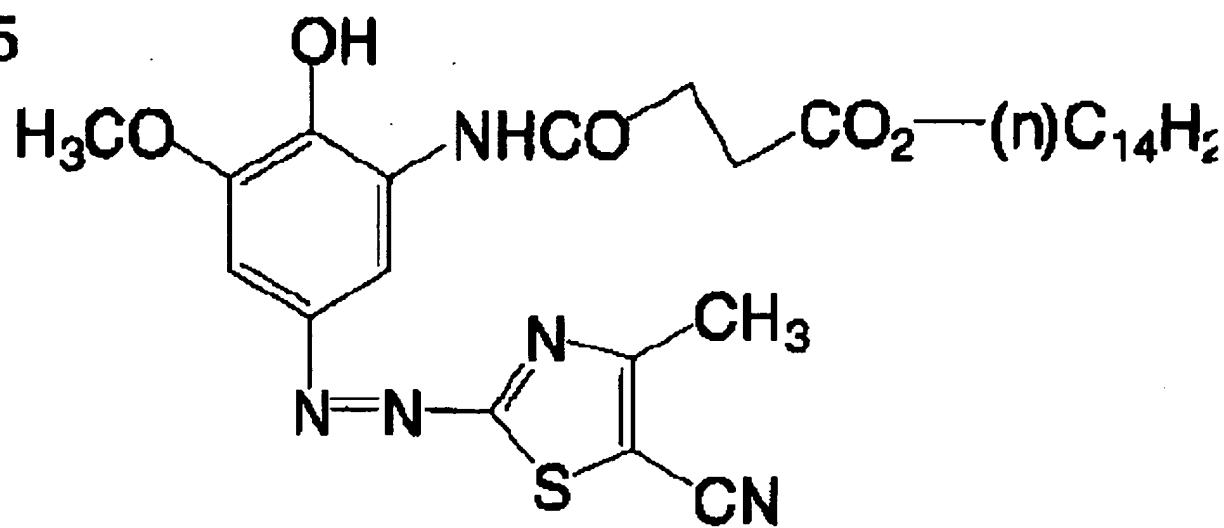
[0019]

[Formula 5]

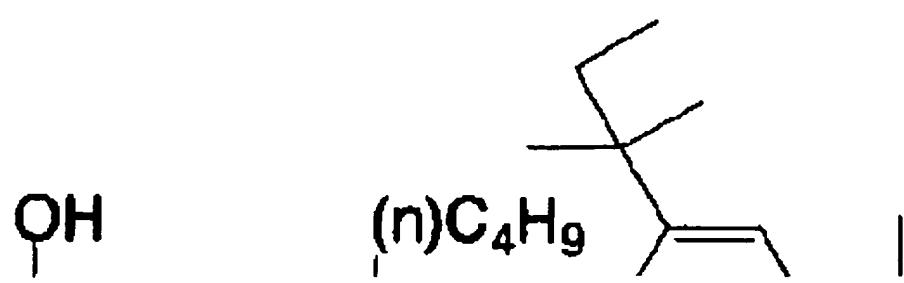
1 - 4



| - 5

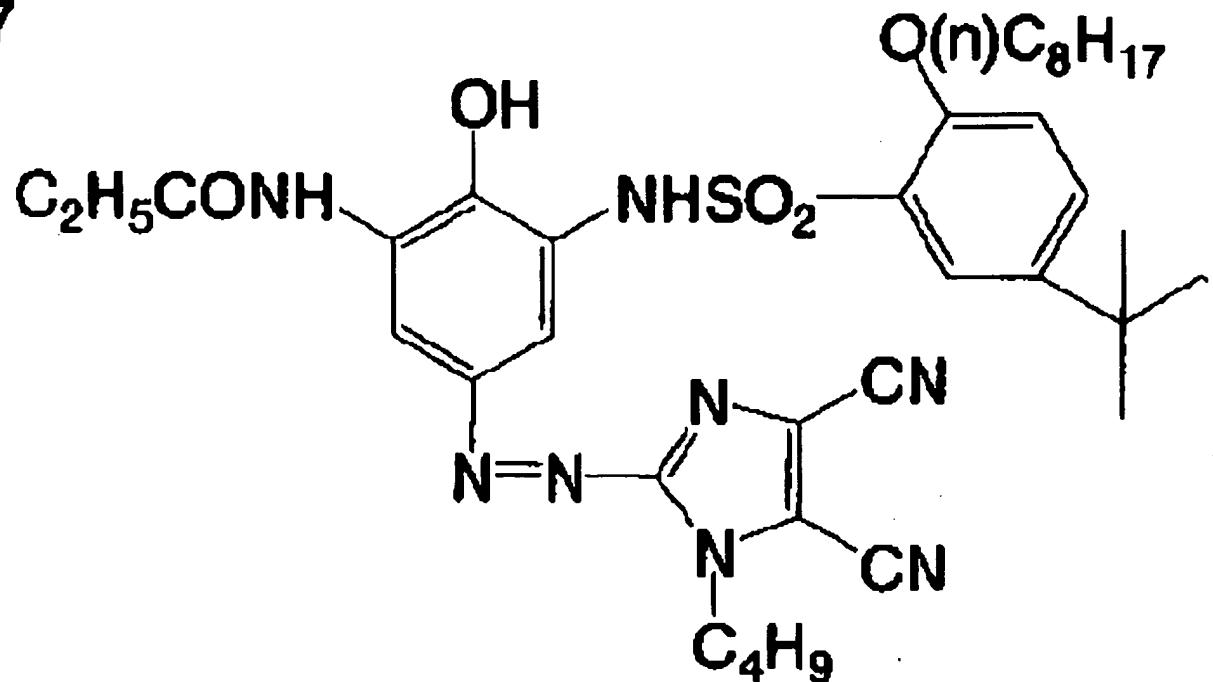


| - 6

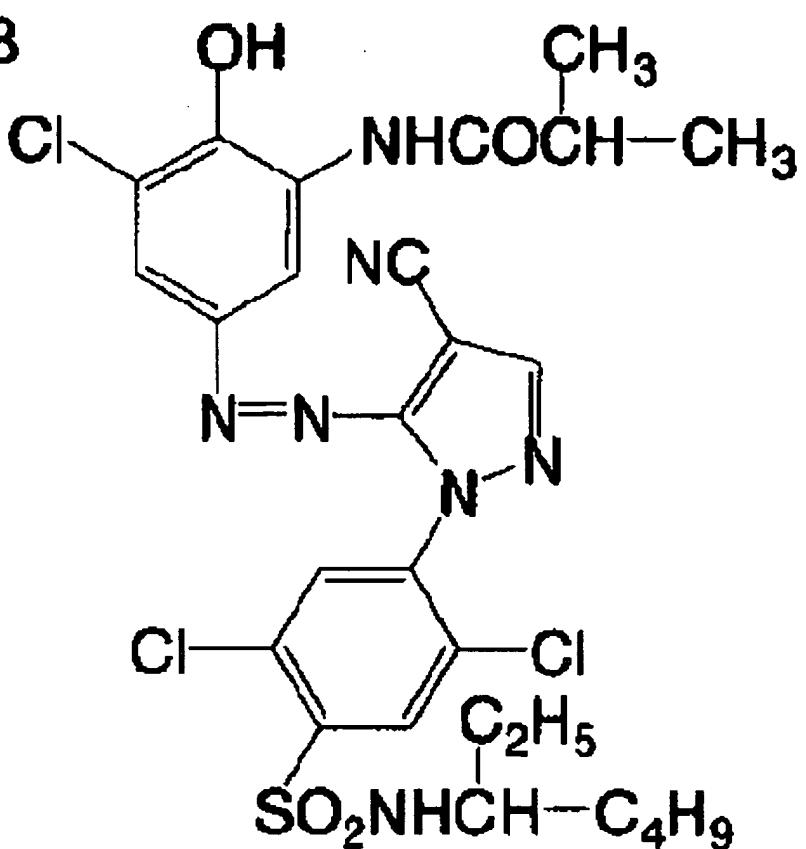


[0020]  
[Formula 6]

I - 7

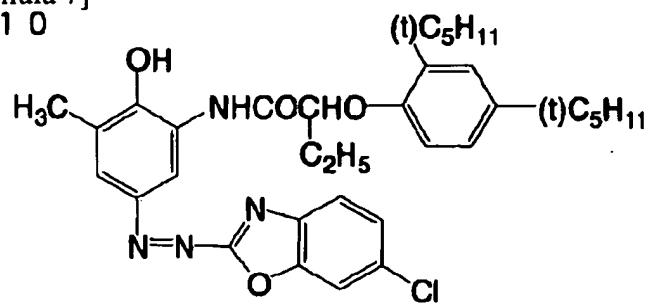


I - 8

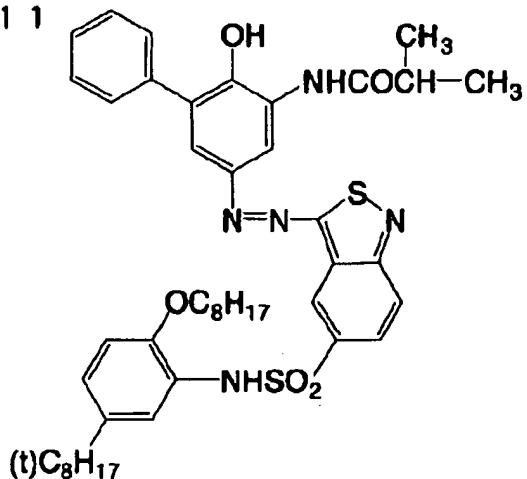


[0021]  
[Formula 7]

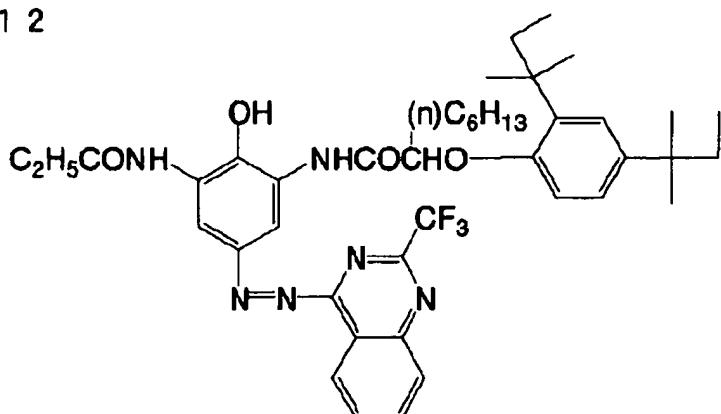
I - 1 0



I - 1 1

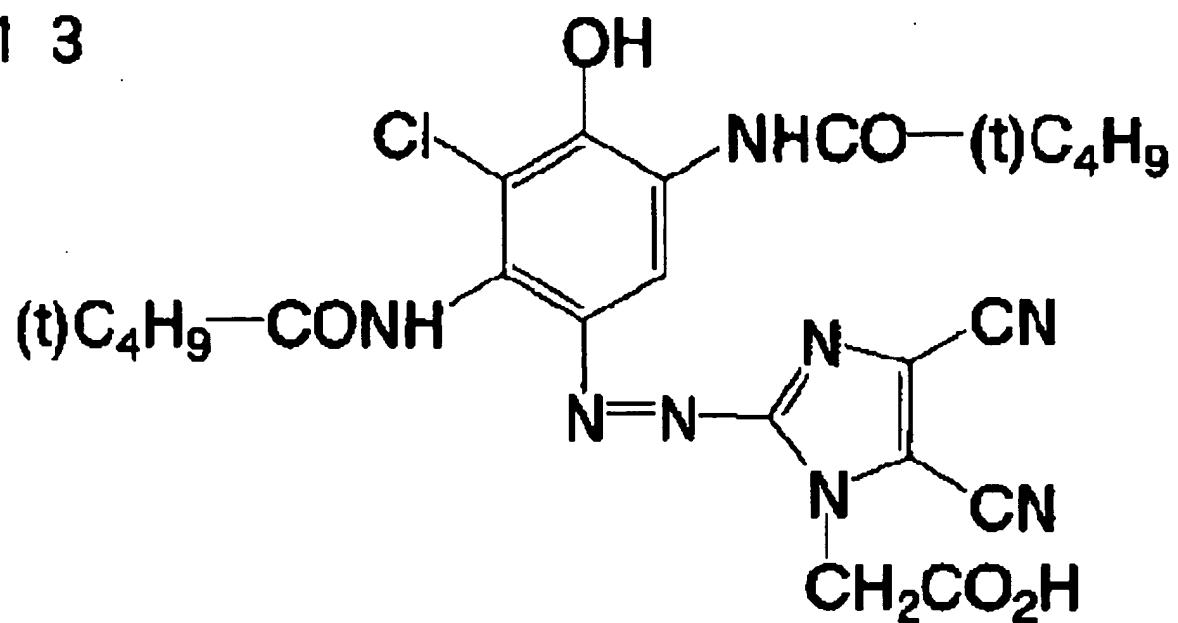


I - 1 2

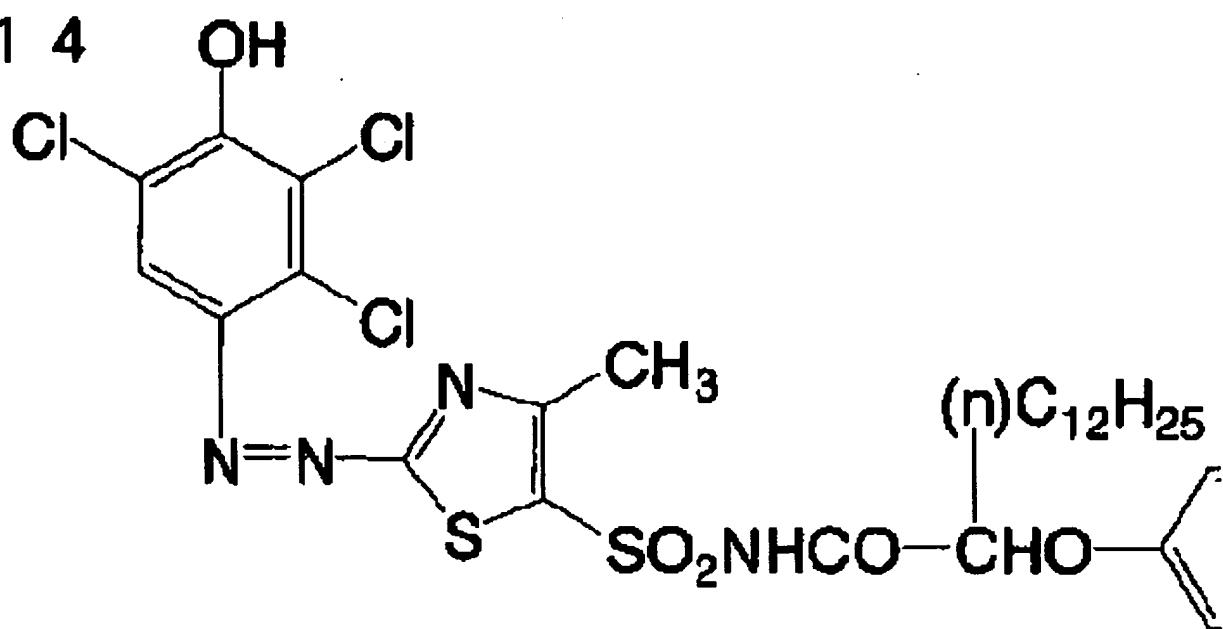


[0022]  
[Formula 8]

I - 1 3

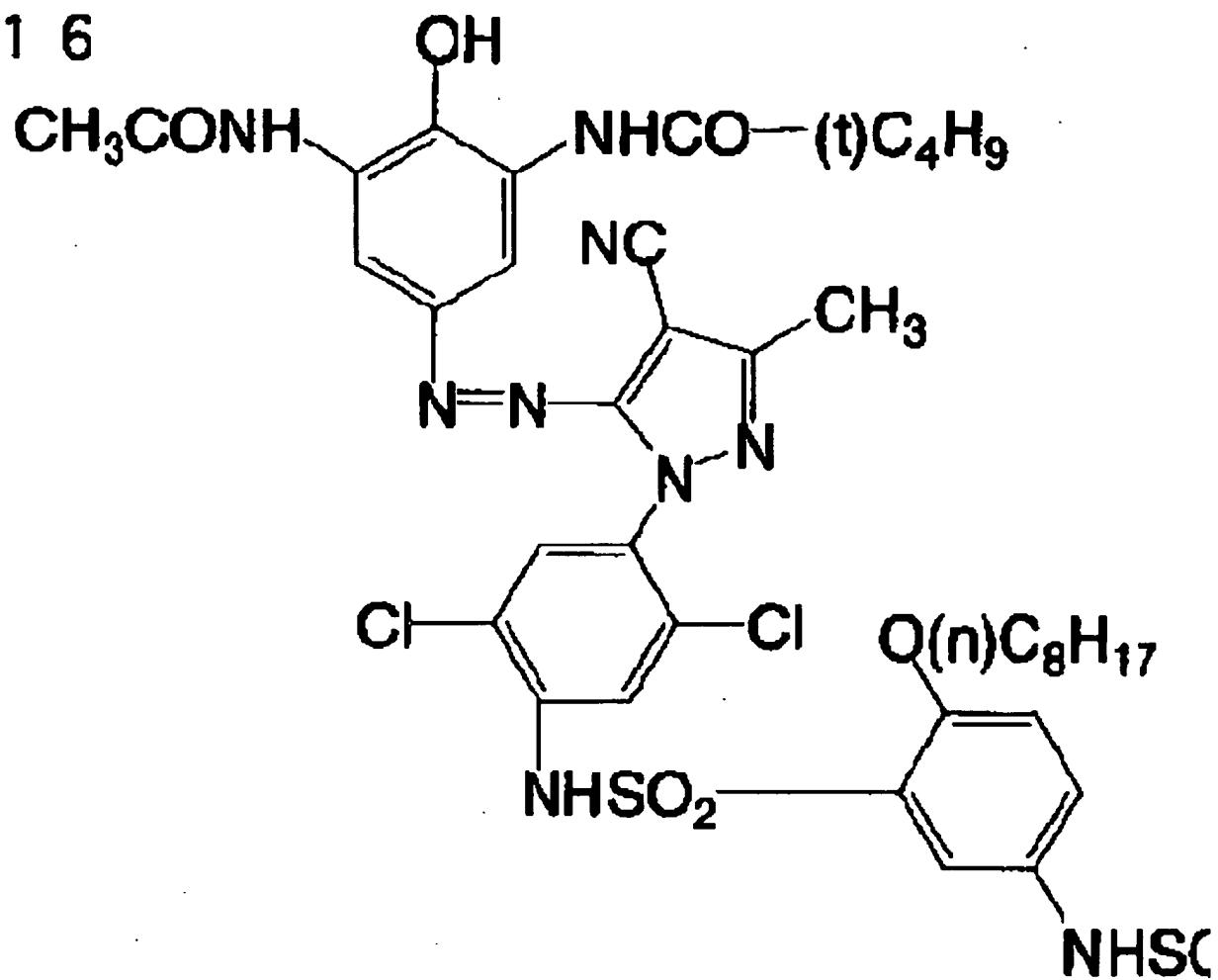


1 - 1 4

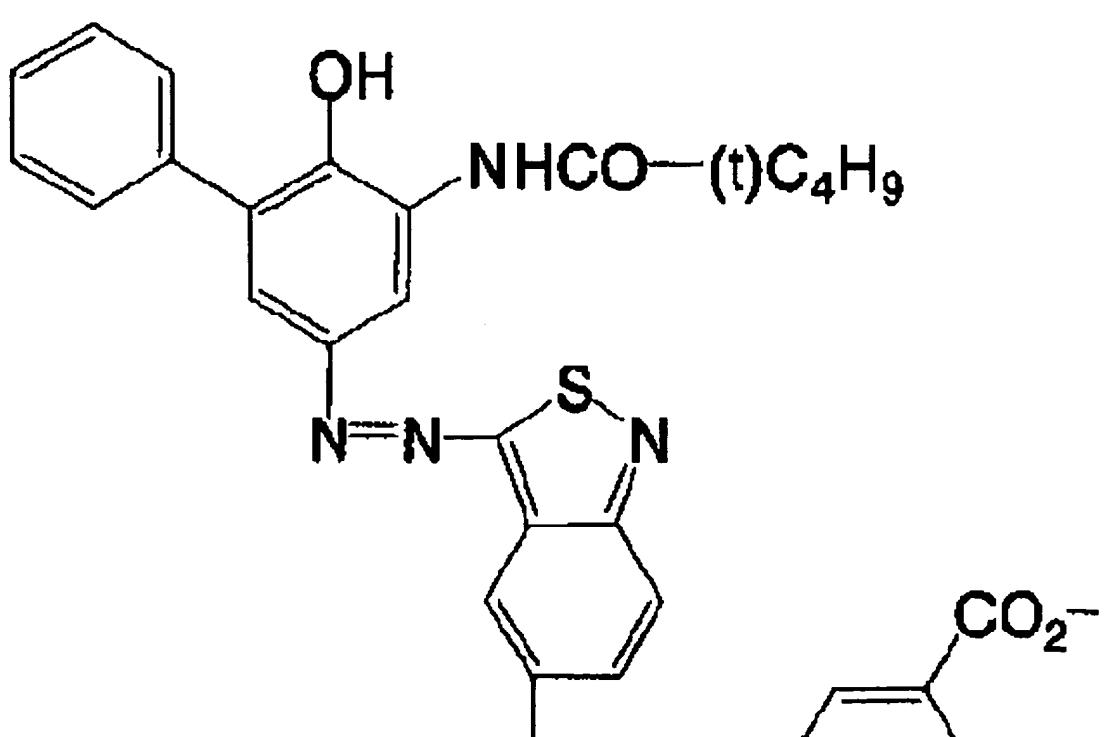


[0023]  
[Formula 9]

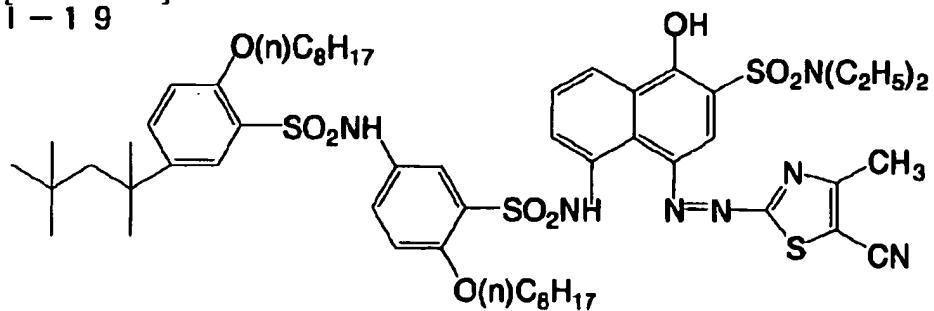
I - 1 6



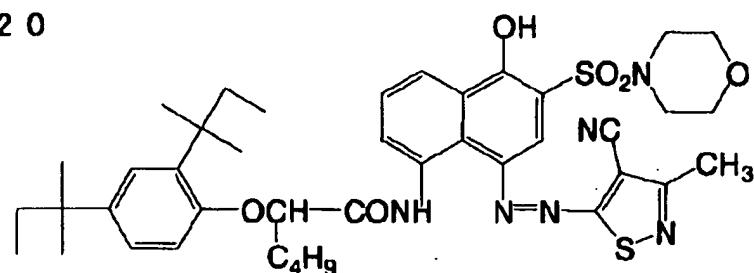
I - 1 7



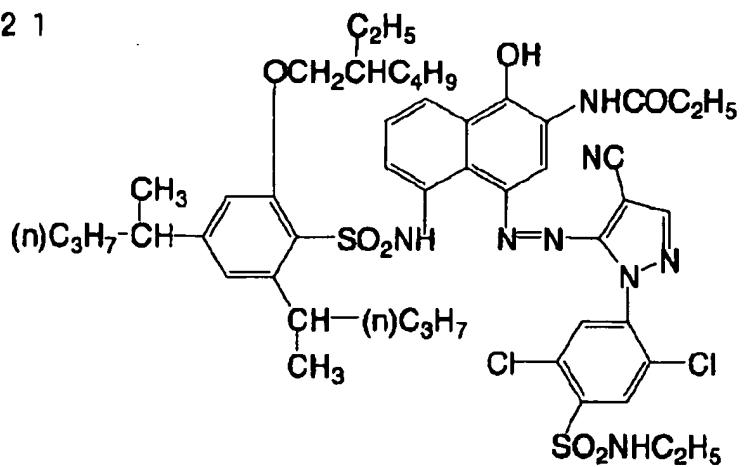
[0024]  
[Formula 10]  
1 - 1 9



1 - 2 0

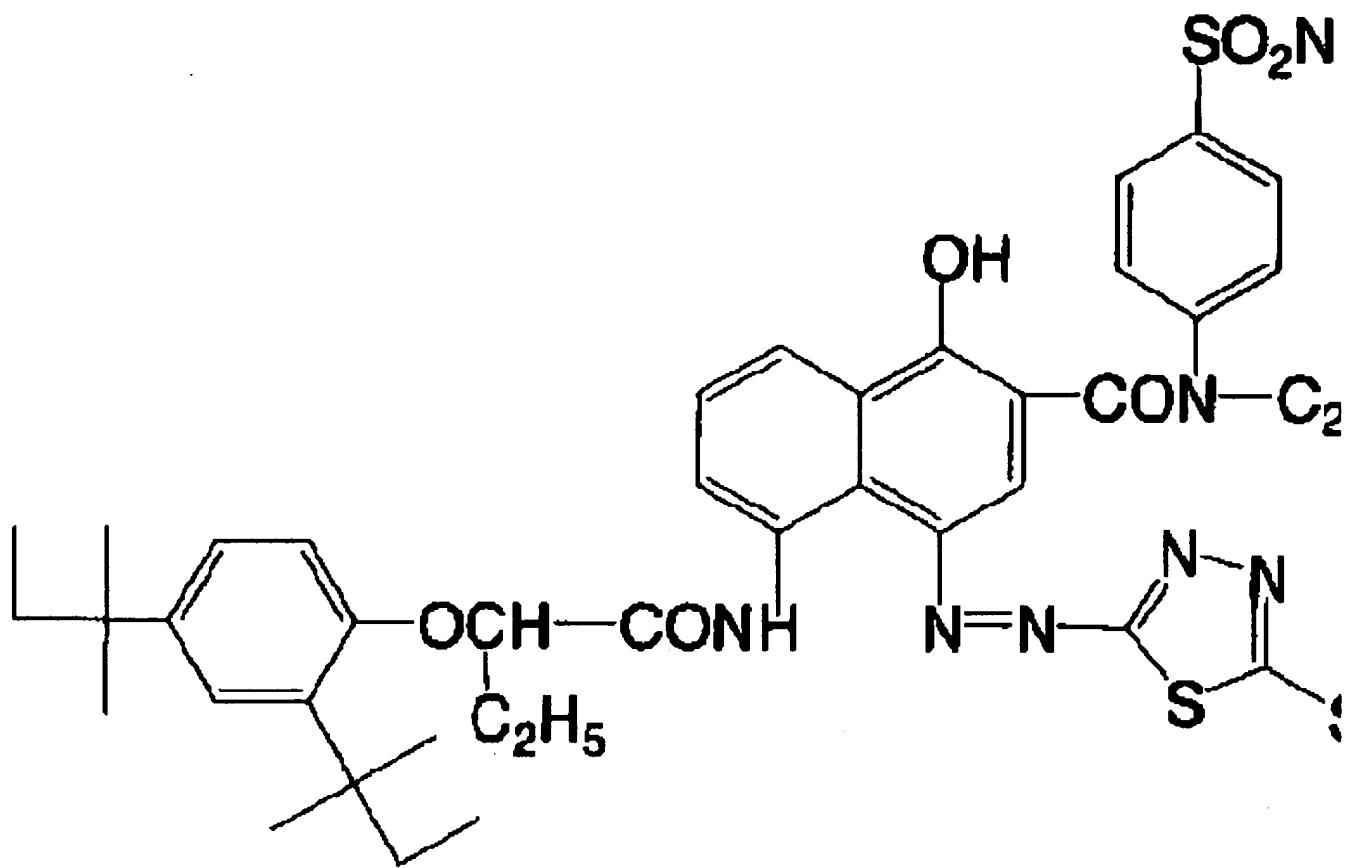


1 - 2 1

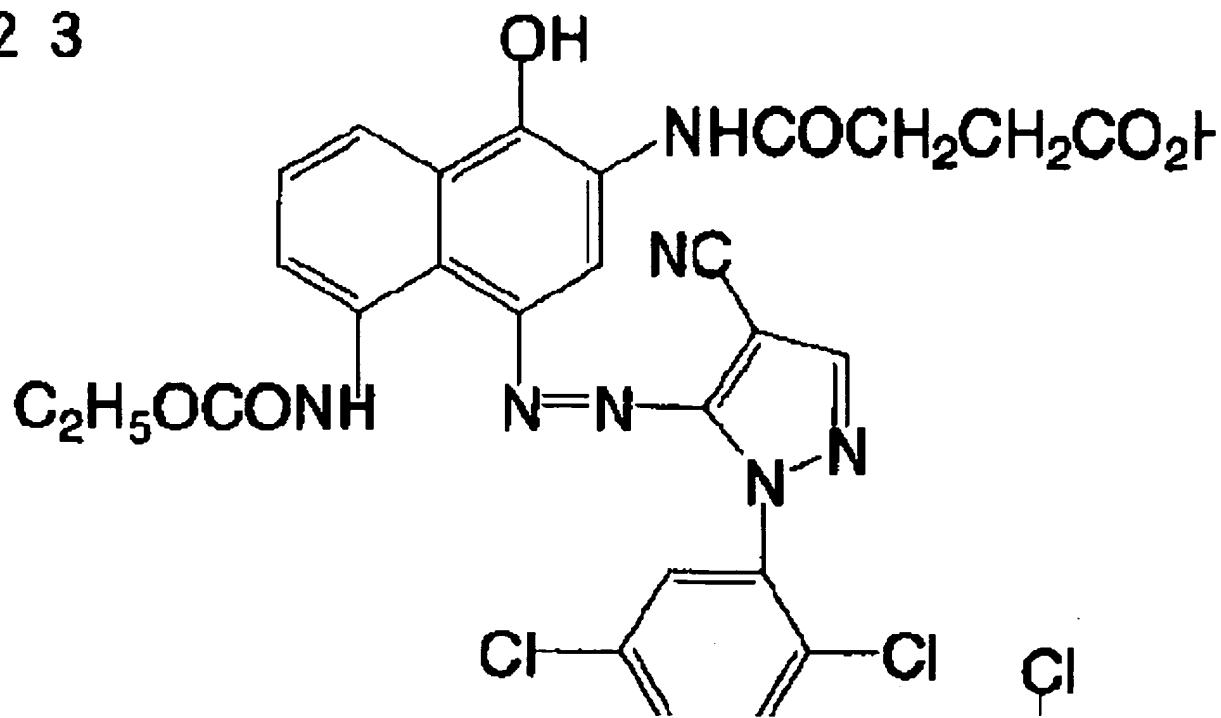


[0025]  
[Formula 11]

1 - 2 2



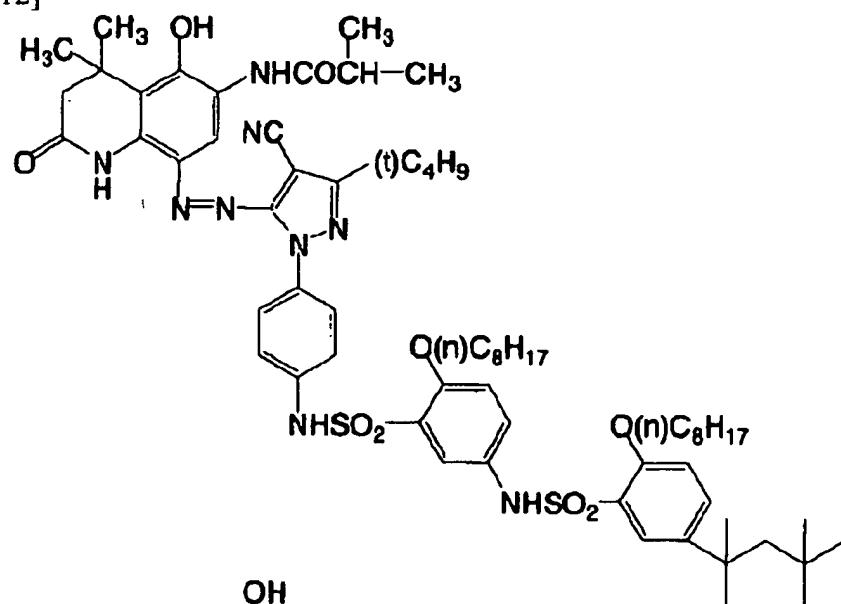
1 - 2 3



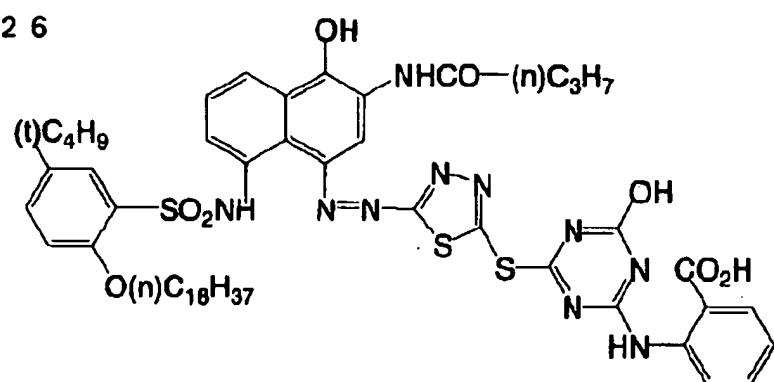
[0026]

[Formula 12]

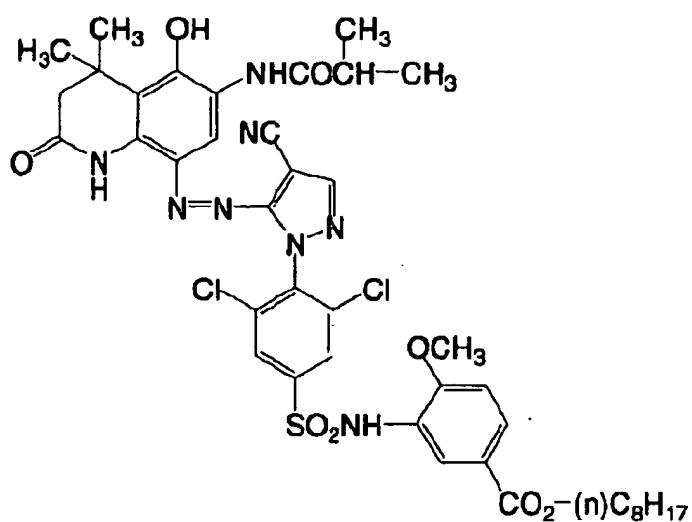
I - 2 5



I - 2 6



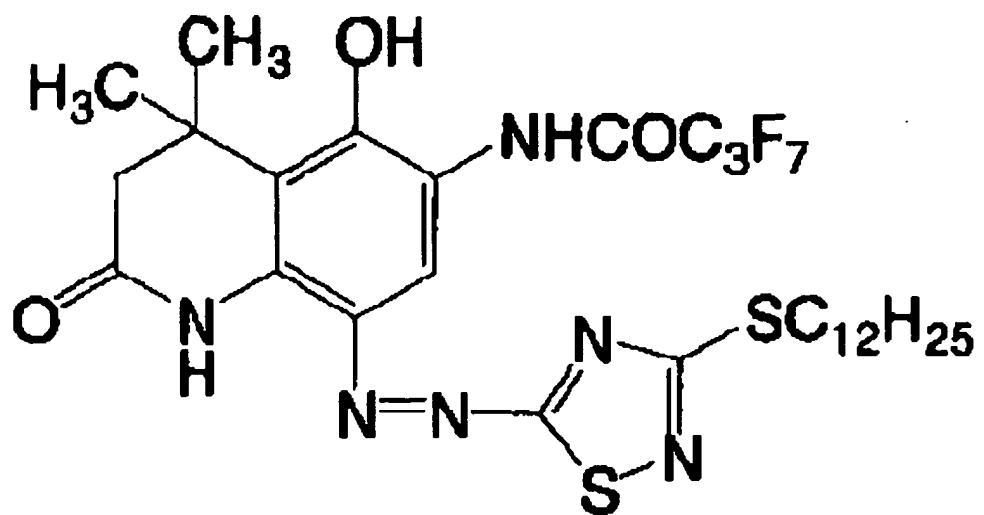
I - 2 7



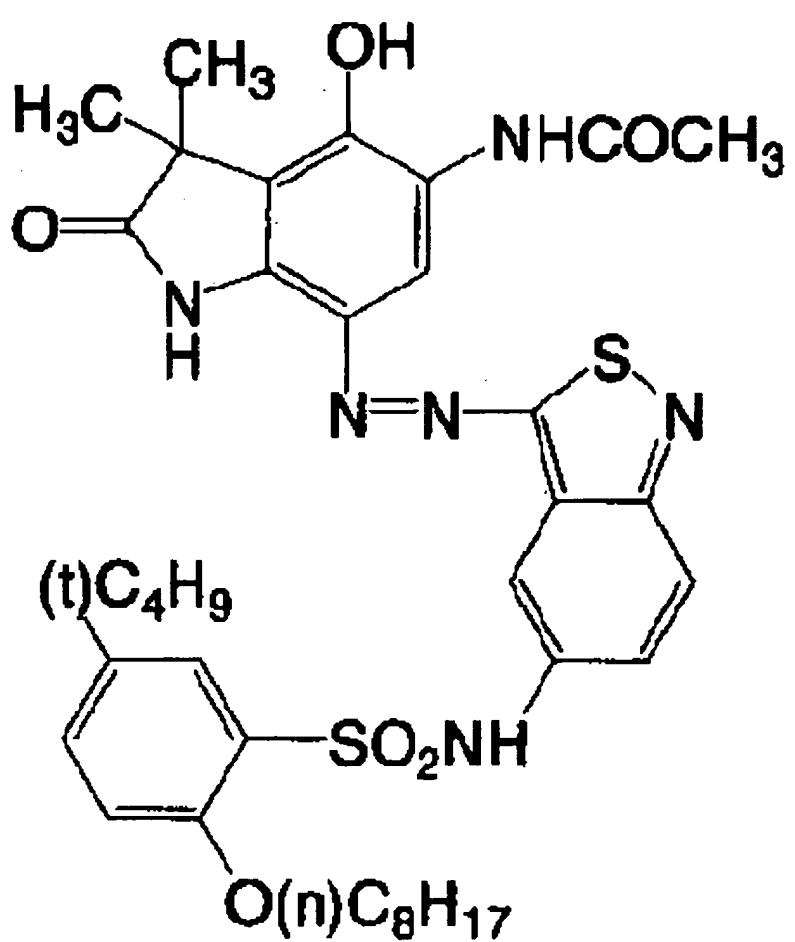
[0027]

[Formula 13]

I - 2 8



I - 2 9



[0028] - Oil solubility polymer - Although there is especially no limit and it can choose suitably as said oil solubility polymer according to the purpose, vinyl polymer is mentioned suitably. Although a well-known thing may be conventionally mentioned as said vinyl polymer and you may be that of any peach of a water-insoluble genotype, a moisture powder (self-emulsification) mold, and a water-soluble mold, the thing of the moisture powder type in points, such as the manufacture ease of a coloring particle and distributed stability, is desirable.

[0029] As said moisture powder type vinyl polymer, you may be any of the thing of an ionic dissociation mold, the thing of a nonionic dispersibility radical content mold, or the thing of these hybrid models. The vinyl polymer containing anionic dissociative radicals, such as vinyl polymer which contains cationic dissociative radicals, such as the third class amino group, as said ionic dissociation type of vinyl polymer, and a carboxylic acid, a sulfonic acid, is mentioned. As said nonionic dispersibility radical content type of vinyl polymer, the vinyl polymer containing nonionic dispersibility radicals, such as a polyethyleneoxy chain, is mentioned. Also in these, the vinyl polymer of the ionic dissociation mold containing an anionic dissociative radical, the vinyl polymer of a nonionic dispersibility radical content mold, and the vinyl polymer of a hybrid model are desirable in respect of the distributed stability of a coloring particle.

[0030] As a monomer which forms said vinyl polymer, the following are mentioned, for example. On acrylic ester and a concrete target, namely, methyl acrylate, ethyl acrylate, n-propylacrylate, isopropyl acrylate, n-butyl acrylate, Isobutyl acrylate, sec-butyl acrylate, tert-butyl acrylate, Amyl acrylate, hexyl acrylate, 2-ethylhexyl acrylate, Octyl acrylate, tert-octyl acrylate, 2-chloro ethyl acrylate, 2-BUROMO ethyl acrylate, 4-chlorobutyl acrylate, cyano ethyl acrylate, 2-acetoxy ethyl acrylate, benzyl acrylate, methoxybenzyl acrylate, 2-chloro cyclohexyl acrylate, cyclohexyl acrylate, Furfuryl acrylate, tetrahydrofurfuryl acrylate, phenyl acrylate, 5-hydroxy pentyl acrylate, 2, and 2-dimethyl-3-hydroxypropyl acrylate, 2-methoxy ethyl acrylate, 3-methoxy butyl acrylate, 2-ethoxyethyl acrylate, 2-butoxy ethyl acrylate, 2-(2-methoxyethoxy) ethyl acrylate, 2-(2-butoxyethoxy) ethyl acrylate, Glycidyl acrylate, 1-BUROMO-2-methoxy ethyl acrylate, 1, and 1-dichloro-2-ethoxyethyl acrylate, 2 and 2, 2-tetrafluoro ethyl acrylate, 1H, 1H and 2H, 2H-perfluoro decyl acrylate, etc. are mentioned.

[0031] On methacrylic ester and a concrete target, methyl methacrylate, ethyl methacrylate, n-propyl methacrylate, isopropyl methacrylate, n-butyl methacrylate, Isobutyl methacrylate, sec-butyl methacrylate, tert-butyl methacrylate, Amyl methacrylate, hexyl methacrylate, cyclohexyl methacrylate, Benzyl methacrylate, chloro benzyl methacrylate, octyl methacrylate, Stearyl methacrylate, 2-(3-phenyl propyloxy) ethyl methacrylate, Furfuryl methacrylate, tetrahydrofurfuryl methacrylate, Phenyl methacrylate, cresyl methacrylate, naphthyl methacrylate, 2-hydroxyethyl methacrylate, 4-hydroxy butyl methacrylate, Triethylene glycol mono-methacrylate, dipropylene glycol mono-methacrylate, 2-methoxy ethyl methacrylate, 3-methoxy butyl methacrylate, 2-ethoxyethyl methacrylate, 2-iso-propoxy ethyl methacrylate, 2-butoxyethylmethacrylate, 2-(2-methoxyethoxy) ethyl methacrylate, 2-(2-ethoxy ethoxy) ethyl methacrylate, 2-(2-butoxyethoxy) ethyl methacrylate, 2-acetoxy ethyl methacrylate, 2-acetoacetoxyethylmethacrylate, Allyl compound methacrylate, glycidyl methacrylate, 2

and 2, 2-tetrafluoro ethyl methacrylate, 1H, 1H and 2H, 2H-perfluoro DESHIRU methacrylate, etc. are mentioned.

[0032] Vinyl acetate, vinyl propionate, vinyl butyrate, vinyl iso butyrate, vinyl caproate, vinyl chloro acetate, vinyl methoxy acetate, vinyl phenyl acetate, benzoic-acid vinyl, salicylic-acid vinyl, etc. are mentioned to vinyl ester and a concrete target.

[0033] On acrylamides and a concrete target, acrylamide, methylacrylamide, Ethyl acrylamide, propyl acrylamide, butyl acrylamide, tert-butyl acrylamide, tert-octyl acrylamide, Cyclohexyl acrylamide, benzyl acrylamide, hydroxymethyl acrylamide, Methoxymethyl acrylamide, butoxy methylacrylamide, methoxy ethyl acrylamide, Phenyl acrylamide, dimethyl acrylamide, diethyl acrylamide, beta-cyano ethyl acrylamide, N-(2-acetoacetoxyethyl) acrylamide, diacetone acrylamide, etc. are mentioned.

[0034] Methacrylamide, methyl methacrylamide, ethyl methacrylamide, propyl methacrylamide, butyl methacrylamide, tert-butyl methacrylamide, cyclohexyl methacrylamide, benzyl methacrylamide, hydroxymethyl methacrylamide, methoxy ethyl methacrylamide, phenyl methacrylamide, dimethyl methacrylamide, beta-cyano ethyl methacrylamide, N-(2-acetoacetoxyethyl) methacrylamide, etc. are mentioned to methacrylamide and a concrete target.

[0035] Methyl styrene, styrene, for example, styrene, such as dicyclopentadiene, ethylene, propylene, 1-butene, 1-pentene, vinyl chloride, vinylidene-chloride, isoprene, chloroprene, butadiene, 2, and 3-dimethylbutadiene, dimethyl styrene, trimethyl styrene, ethyl styrene, isopropyl styrene, KURORU methyl styrene, methoxy styrene, acetoxy styrene, KURORU styrene, dichloro styrene, bromine styrene, vinyl benzoic-acid methyl ester, etc. are mentioned to olefins and a concrete target.

[0036] The methyl vinyl ether, butyl vinyl ether, hexyl vinyl ether, methoxy ethyl vinyl ether, etc. are mentioned to vinyl ether and a concrete target.

[0037] As other monomers, crotonic-acid butyl, crotonic-acid hexyl, Dimethyl itaconate, dibutyl itaconate, a diethyl maleate, maleic-acid dimethyl, Dibutyl maleate, diethyl fumarate, dimethyl fumarate, fumaric-acid dibutyl, A methyl vinyl ketone, a phenyl vinyl ketone, a methoxy ethyl vinyl ketone, N-vinyl oxazolidone, N-vinyl pyrrolidone, vinylidene chloride, Methylene chestnut nitril, vinylidene, diphenyl-2-acryloyloxyethyl phosphate, Diphenyl-2-methacryloiloxy-ethyl phosphate, dibutyl-2-acryloyloxyethyl phosphate, dioctyl-2-methacryloiloxy-ethyl phosphate, etc. are mentioned.

[0038] Moreover, as a monomer which has a dissociative radical, the monomer which has an anionic dissociative radical, and the monomer which has a cationic dissociative radical are mentioned.

[0039] As a monomer which has said anionic dissociative radical, a carboxylic-acid monomer, a sulfonic-acid monomer, a phosphoric-acid monomer, etc. are mentioned, for example.

[0040] As said carboxylic-acid monomer, an acrylic acid, a methacrylic acid, an itaconic acid, a maleic acid, a fumaric acid, a citraconic acid, a crotonic acid, itaconic-acid monoalkyl ester (for example, itaconic-acid monomethyl, itaconic-acid monoethyl, itaconic-acid monobutyl, etc.), maleic-acid monoalkyl ester (for example, maleic-acid monomethyl, maleic-acid monoethyl, maleic-acid monobutyl, etc.), etc. are mentioned, for example.

[0041] As said sulfonic-acid monomer, for example A styrene sulfonic acid, a vinyl

sulfonic acid, an acryloyloxy alkyl sulfonic acid (for example, acryloyloxy methylsulfonic acid --) An acryloyloxyethyl sulfonic acid, an acryloyloxypropyl sulfonic acid, etc., a methacryloyloxy alkyl sulfonic acid (for example, methacryloyloxy methylsulfonic acid --) A methacryloiloxy-ethyl sulfonic acid, a methacryloyl oxypropyl sulfonic acid, etc., an acrylamide alkyl sulfonic acid (for example, 2-acrylamide-2-methyl ethane sulfonic acid --) 2-acrylamido-2-methyl propane sulfonic acid, a 2-acrylamide-2-methyl-butane sulfonic acid, etc., Methacrylamide alkyl sulfonic acids (for example, 2-methyl-KURURI amide-2-methyl ethane sulfonic acid, a 2-methacrylamide-isobutane sulfonic acid, a 2-methacrylamide-2-methyl-butane sulfonic acid, etc.) etc. are mentioned.

[0042] As said phosphoric-acid monomer, vinyl phosphonic acid, methacryloiloxy-ethyl phosphonic acid, etc. are mentioned, for example.

[0043] Also in these, an acrylic acid, a methacrylic acid, a styrene sulfonic acid, a vinyl sulfonic acid, an acrylamide alkyl sulfonic acid, and a methacrylamide alkyl sulfonic acid are desirable, and an acrylic acid, a methacrylic acid, a styrene sulfonic acid, 2-acrylamido-2-methyl propane sulfonic acid, and a 2-acrylamide-2-methyl-butane sulfonic acid are more desirable.

[0044] As a monomer which has said cationic dissociative radical, the monomer which has the 3rd class amino groups, such as dialkylamino ethyl methacrylate and a dialkylamino ethyl ATAKURI rate, is mentioned, for example.

[0045] Moreover, the macro monomer which contains the ester of polyethylene-glycol monoalkyl ether and a carboxylic-acid monomer, the ester of polyethylene-glycol monoalkyl ether and a sulfonic-acid monomer, the ester of polyethylene-glycol monoalkyl ether and a phosphoric-acid monomer, polyethylene-glycol monoalkyl ether and the vinyl group content urethane formed from an isocyanate radical content monomer, and polyvinyl alcohol structure as a monomer containing a nonionic dispersibility radical, for example is mentioned. As the number of repeats of the ethyleneoxy section of said polyethylene-glycol monoalkyl ether, 8-50 are desirable and 10-30 are more desirable. As a carbon atomic number of the alkyl group of said polyethylene-glycol monoalkyl ether, 1-20 are desirable and 1-12 are more desirable.

[0046] It may be used by the one-sort independent and vinyl polymer may be formed, two or more sorts may be used together, vinyl polymer may be formed, and these monomers can be suitably chosen according to the purposes (Tg accommodation, soluble amelioration, distributed object stability, etc.) of said vinyl polymer.

[0047] In this invention, what has said dissociative radical also in said vinyl polymer is desirable, what has either [ at least ] a carboxyl group or a sulfonic group as said dissociative radical is more desirable, and especially the thing that has a carboxyl group as said dissociative radical is desirable.

[0048] As a content of the dissociative radical in said vinyl polymer, 0.1 - 3.0 mmol/g is desirable and 0.2 - 2.0 mmol/g is more desirable. In addition, when there are few contents of said dissociative radical, the self-emulsifiability of vinyl polymer is small, in many, water solubility becomes high and there is an inclination to stop being suitable for distribution of a color.

[0049] In addition, as said dissociable group, as said anionic dissociable group, you may be alkali metal (for example, Na, K, etc.) or the salt of ammonium ion, and may be the salt of an organic acid (for example, an acetic acid, a propionic acid, methansulfonic

acid) or inorganic acids (a hydrochloric acid, sulfuric acid, etc.) further as said cationic dissociable group.

[0050] Example (P-1) -P-105 of said vinyl polymer are enumerated below. The ratio in a parenthesis means a mass ratio. In addition, this invention is not limited to these examples at all.

[0051] P-1) Methyl methacrylate-ethyl acrylate copolymer P-2 (50:50) Methyl methacrylate-methyl acrylate copolymer P-3 (65:35) Butyl acrylate-styrene copolymer P-4 (50:50) Polyethyl methacrylate P-5 Pori n-butyl methacrylate P-6 Poly isobutyl methacrylate P-7 Poly isopropyl methacrylate P-8 Poly methyl chloro acrylate P-9 Pori (2-tert-buthylphenyl acrylate)

P-10) Pori (4-tert-buthylphenyl acrylate)

P-11) N-butyl methacrylate-N-vinyl-2-pyrrolidone copolymer P-12 (90:10) Methyl methacrylate-vinyl chloride copolymer P-13 (70:30) Methyl methacrylate-styrene copolymer P-14 (50:50) Isobutyl methacrylate-butyl acrylate copolymer P-15 (55:45) N-butyl methacrylate-methyl methacrylate-styrene copolymer (50:30:20) [0052] P-16) Vinyl acetate-acrylamide copolymer P-17 (85:15) Vinyl chloride vinyl acetate copolymer P-18 (65:35) The n-butyl acrylate-methyl methacrylate-n-butyl methacrylate copolymer (35:35:30) P-19 A diacetone acrylamide-methyl methacrylate copolymer (50:50) P-20 An ethyl methacrylate-n-butyl acrylate copolymer (70:30) P-21 Methyl methacrylate-cyclohexyl acrylate copolymer P-22 (50:50) The tert-butyl methacrylamide-methyl methacrylate-acrylic-acid copolymer (60:30:10) P-23 An n-butyl acrylate-acrylic-acid copolymer (80:20) P-24 Methyl methacrylate-isobutyl methacrylate-acrylic-acid copolymer (52:28:20) P-25 n-butyl methacrylate-pentyl methacrylate-methacrylic-acid copolymer sec-butyl acrylate-acrylic-acid copolymer P-26 (85:15) ( [ 3 ] 8:38:24P-27 The ethyl acrylate-acrylic acid (95:5) P-28 An isopropyl acrylate-acrylic-acid copolymer (90:10) P-29 Butyl methacrylate-2-hydroxyethyl methacrylate-acrylic-acid copolymer P-30 (85:5:10) Cyano ethyl acrylate-benzyl methacrylate-acrylic-acid copolymer (60:30:10) [0053] P-31) Isobutyl methacrylate-tetrahydrofurfuryl acrylate-acrylic-acid copolymer P-32 (60:30:10) The n-butyl methacrylate-tert-butyl acrylamide-acrylic-acid copolymer (55:37:8) P-33 n-butyl methacrylate - 1H, 1H, 2H, and 2H-perfluoro decyl acrylate-acrylic-acid copolymer P-34 (75:20:5) The methyl methacrylate-n-butyl acrylate-acrylic-acid copolymer (50:45:5) P-35 2 ethylhexyl-methacrylate-methyl acrylate-acrylic-acid copolymer P-36 (40:55:5) 3-methoxy butyl methacrylate-styrene-acrylic-acid copolymer P-37 (35:50:15) Cyclohexyl methacrylate-allyl compound methacrylate - The acrylic-acid copolymer (35:50:15) P-38 isopropyl methacrylate-furfuryl methacrylate-acrylic-acid copolymer P-39 (80:10:10) The isopropyl methacrylate-2-butoxyethylmethacrylate-acrylic-acid copolymer (75:15:10) P-40 ethyl acrylate-phenyl methacrylate-acrylic-acid copolymer P-41 (72:15:13) The isobutyl methacrylate-2-(2-ethoxy ethoxy) ethyl methacrylate-acrylic-acid copolymer (80:10:10) P-42 Methacrylic ester-acrylic-acid copolymer P-43 of the isobutyl methacrylate-polyethylene-glycol monomethyl ether (23 ethyleneoxy chain repeats) (70:20:10) Isobutyl methacrylate-dipropylene glycol mono-methacrylate-bitter taste The Lil acid copolymer (85:5:10) P-44 The methacrylic ester-acrylic acid of the isobutyl methacrylate-polyethylene-glycol monomethyl ether (nine ethyleneoxy chain repeats) A pile Coalesce P-45 (80:10:10) Isobutyl acrylate-glycidyl methacrylate-acrylic-acid copolymer (75:15:10) [0054] P-46) Isobutyl acrylate-methoxy styrene-acrylic-acid copolymer P-47 (75:15:10) The isobutyl acrylate-N-vinyl-

pyrrolidone-acrylic-acid copolymer (60:30:10) P-48 A tert-butyl acrylate-methacrylic-acid copolymer (88:12) P-49 Hexyl acrylate-styrene-methacrylic-acid copolymer P-50 (80:5:15) The 2, 2, and 2-tetrafluoro ethyl methacrylate-methyl methacrylate copolymer-methacrylic-acid copolymer (25:60:15) P-51 Ethyl methacrylate-2-methoxy ethyl methacrylate-methacrylic-acid copolymer P-52 (70:15:15) The ethyl methacrylate-2-ethoxyethyl methacrylate-methacrylic-acid copolymer (70:15:15) P-53 vinyl acetate-methacrylic-acid copolymer (85:1) 5) P-54 N-butyl methacrylate-acrylamide-methacrylic-acid copolymer P-55 (70:15:15) The tert-octyl acrylamide-propyl methacrylate-methacrylic-acid copolymer (20:65:15) P-56 N-butyl methacrylate-butoxy methylacrylamide-methacrylic-acid copolymer P-57 (80:5:15) The n-butyl methacrylate-diphenyl-2-methacryloiloxy-ethyl phosphate-methacrylic-acid copolymer (80:5:15) P-58 isobutyl methacrylate-dimethyl acrylamide-methacrylic-acid copolymer P-59 (70:15:15) The n-butyl methacrylate-butyl acrylamide-methacrylic-acid copolymer (70:15:15) P-60 n-butyl methacrylate-phenyl acrylamide-methacrylic-acid copolymer (70:15:15) [0055] P-61) N-butyl methacrylate-methacrylamide-methacrylic-acid copolymer P-62 (70:15:15) The n-butyl methacrylate-methoxy ethyl methacrylamide-methacrylic-acid copolymer (70:15:15) P-63 n-butyl methacrylate-N-vinyl-pyrrolidone-methacrylic-acid copolymer P-64 (70:15:15) Isobutyl methacrylate - The 1H, 1H, 2H, and 2H-perfluoro decyl acrylate-methacrylic-acid copolymer (55:30:15) P-65 isobutyl methacrylate-2-(2-methoxyethoxy) ethyl methacrylate-methacrylic-acid copolymer P-66 (50:35:15) The n-butyl methacrylate-styrene sulfonic-acid copolymer (90:10) P-67 An ethyl methacrylate-styrene sulfonic-acid copolymer (90:10) P-68 n-butyl acrylate-styrene-styrene sulfonic-acid copolymer P-69 (80:10:10) Isobutyl methacrylate-styrene sulfonic-acid copolymer P-70 (90:10) Isobutyl acrylate-triethylene glycol mono-methacrylate-styrene The sulfonic-acid copolymer (80:10:10) P-71 n-butyl acrylate - 1H, 1H, 2H, and 2H-perfluoro DESHIRU methacrylate-styrene sulfonic-acid copolymer P-72 (80:10:10) n-butyl acrylate-2-butoxyethylmethacrylate-styrene sulfonic-acid copolymer (70:20:10) P-73 N-butyl methacrylate-2-acrylamide-2-methyl ethane-sulfonic-acid copolymer P-74 (90:10) n-butyl acrylate-2-butoxyethylmethacrylate-2-acrylamide-2-methyl ethane-sulfonic-acid copolymer (70:20:10) P-75 Isobutyl methacrylate-2-acrylamide-2-methyl ethane-sulfonic-acid copolymer (90:10) [0056] P-76) Isobutyl acrylate-n-butyl methacrylate-2-acrylamide - 2-methyl ethane-sulfonic-acid copolymer (70:20:10) P-77 ethyl acrylate-tert-Butyl methacrylate-2-acrylamide-2-methyl ethane-sulfonic-acid copolymer () [ 6] 0:30:10P-78 N-butyl methacrylate-2-acrylamido-2-methyl-propane-sulfonic-acid copolymer P-79 (90:10) The ethyl methacrylate-2-acrylamido-2-methyl-propane-sulfonic-acid copolymer (90:10) P-80 Ethyl acrylate-tert-butyl methacrylate-2-acrylamido-2-methyl-propane-sulfonic-acid copolymer P-81 (60:30:10) n-butyl acrylate-tert-butyl methacrylate-2-acrylamido-2-methyl propane sulfonic acid polymer (60:30:10) P-82 tert-butyl acrylate-tetrahydrofurfuryl acrylate-isobutane sulfonic-acid copolymer P-83 (50:40:10) tert-butyl acrylate-1H, 1H, 2H, and 2H-perfluoro DESHIRU methacrylate-2-acrylamido-2-methyl-propane-sulfonic-acid copolymer P-84 (60:30:10) tert-butyl acrylate-polyethylene-glycol monomethyl ether Methacrylic ester-2-acrylamido-2-methyl-propane-sulfonic-acid copolymer P-85 with (23 ethyleneoxy chain repeats) (60:30:10) Isobutyl acrylate-N-vinyl-pyrrolidone-2-acrylamido-2-methyl-propane-sulfonic-acid copolymerization the body (60:30:10) P-86 Ethyl methacrylate-2-acrylamido-2-methyl-propane-sulfonic-acid soda copolymer P-87 (90.4:9.6) The n-butyl

methacrylate-2-acrylamido-2-methyl-propane-sulfonic-acid soda copolymer (98:12) P-88 Isobutyl methacrylate-2-acrylamido-2-methyl-propane-sulfonic-acid soda copolymer P-89 (90.4:9.6) N-butyl methacrylate - tert-butyl methacrylate-2-acrylamide-2-ME Chill propane sulfonic-acid soda copolymer P-90 (50:35:15) Vinyl-pyrrolidone-isobutyl methacrylate-2-acrylamido-2-methyl-propane-sulfonic-acid soda copolymer (50:35:15) [0057] P-91) N-butyl methacrylate-2-methacrylamide-isobutane sulfonic-acid copolymer P-92 (90:10) n-butyl acrylate - tert-butyl methacrylate-2-methacrylamide-isobutane sulfonic-acid copolymer P-93 (60:30:10) Isobutyl AKURIRE - toe hydroxymethyl acrylamide-2-methacrylamide-isobutane sulfonic-acid copolymer P-94 (80:10:10) n-butyl acrylate-tert-butyl methacrylate-vinyl sulfonic-acid copolymer (60:30:10) P-95 Hexyl methacrylate-methyl methacrylate-vinyl sulfonic-acid copolymer P-96 (40:45:15) The ethyl acrylate-tert-butyl methacrylate-vinyl sulfonic-acid copolymer (60:30:10) P-97 n-butyl methacrylate-2-acrylamide-2-methyl-butane sulfonic-acid copolymer P-98 (90:10) The ethyl methacrylate-2-acrylamide-2-methyl-butane sulfonic-acid copolymer (90:10) P-99 Ethyl acrylate - tert-butyl methacrylate-2-acrylamide-2-methyl-butane sulfonic-acid copolymer P-100 (60:30:10) An n-butyl acrylate-tert-butyl methacrylate-2-acrylamide-2-methyl-butane sulfonic acid Pile Coalesce (60:30:10) P-101 ethyl-methacrylate-2-acrylamide-2-methyl-butane sulfonic-acid soda copolymer P-102 (90.4:9.6) N-butyl methacrylate-2-acrylamide-2-methyl-butane sulfonic-acid soda copolymer (98:12) P-103 Isobutyl methacrylate-2-acrylamide-2-methyl-butane sulfonic-acid soda copolymer P-104 (90.4:9.6) N-butyl methacrylate-tert-butyl methacrylate-2-acrylamide-2-methyl-butane sulfonic-acid soda copolymer (50:35:15) P-105 N-butyl methacrylate-2-methacrylamide-2-methyl-butane sulfonic-acid copolymer (90:10) [0058] As molecular weight (Mw) of said vinyl polymer, it is usually 1000-100000 and 3000-50000 are desirable. When there is an inclination it to become difficult to obtain the distributed object of a stable coloring particle as it is less than 1000 and said molecular weight exceeds 100000, the solubility to an organic solvent worsens or there is an inclination the viscosity of an organic solvent increases and it is hard coming to distribute.

[0059] - The coloring particle distribution object of manufacture-this invention of a coloring particle distribution object is manufactured by distributing the coloring particle containing said oil color and said oil solubility polymer to a drainage system medium (liquid which contains water at least). The method of specifically, for example, beforehand, preparing the latex of said oil solubility polymer, and infiltrating said oil color into this or a \*\*\*\*\* variational method is mentioned. The approach of the above making emulsify this organic solvent depending on whether they are adding water to the organic solvent which an emulsification variational method is desirable and contains said oil solubility polymer and said oil color as this \*\*\*\*\* variational method and adding this organic solvent underwater, and \*\*\*\*\*\*, and making it atomize also in these is mentioned suitably.

[0060] in addition, said latex -- water -- said insoluble oil solubility polymer means what was distributed in the drainage system medium as a detailed particle. As a condition of said distribution, you may be any, such as that by which said oil solubility polymer is emulsified in said drainage system medium, a thing by which the emulsion polymerization was carried out, a thing by which micell distribution was carried out, or a thing which the chain itself shape[ of a molecule ]-distributed with hydrophilicity-structure partially [ this oil solubility polymer ] in a molecule.

[0061] As mean particle diameter of said latex, it is usually 1-500nm, and 3-300nm is desirable. As particle size distribution of said latex, there may not be especially a limit, may be large particle size distribution, and may be mono dispersion particle size distribution. In addition, the polymer particle is indicated by "a synthetic-resin emulsion (back Tabira, the Inagaki \*\*\*\*\* , macromolecule publication meeting issue (1978))", "the chemistry (Soichi Muroi work, macromolecule publication meeting issue (1970)) of a macromolecule latex etc.", etc.

[0062] Here, said method of preparing the latex of said oil solubility polymer beforehand, and infiltrating said oil color into this is explained. In addition, it considers as the case where vinyl polymer is used as said oil solubility polymer here. The first example of this approach includes the third process which mixes the first process which prepares a vinyl polymer latex, the second process which prepares the color solution which dissolved said oil color in the organic solvent, and said color solution and said vinyl polymer latex, and prepares a coloring particle distribution object. The second example of this approach includes the third process which mixes the second process which mixes this color solution and the liquid which contains water at least, and prepares color particle dispersion liquid, and said vinyl polymer latex and said color particle dispersion liquid, and prepares a coloring particle distribution object by preparing the first process which prepares a vinyl polymer latex, and the color solution which dissolved said oil color in the organic solvent. As the third example of this approach, the approach of a publication is mentioned to JP,55-139471,A.

[0063] Here, the above explains an emulsification variational method. In addition, it considers as the case where vinyl polymer is used as said oil solubility polymer here.

[0064] The first example of this approach includes the second process which mixes the first process which prepares the vinyl polymer color solution which dissolved said oil color and said vinyl polymer in the organic solvent, said vinyl polymer color solution, and the liquid which contains water at least, and prepares a coloring particle distribution object. The second example of this approach includes the third process which mixes the first process which prepares the color solution which dissolved said oil color in the organic solvent, the second process which prepares the vinyl polymer solution which dissolved said vinyl polymer, and said color solution and said vinyl polymer solution, and the liquid which contains water at least, and prepares a coloring particle distribution object. The first process which the third example of this approach prepares the color solution which dissolved said oil color in the organic solvent, and mixes this color solution and the liquid which contains water at least, and prepares color particle dispersion liquid, The second process which prepares the vinyl polymer solution which dissolved said vinyl polymer, mixes this vinyl polymer solution and the liquid which contains water at least, and produces vinyl polymer particle dispersion liquid, The third process which mixes said color particle dispersion liquid and said vinyl polymer particle dispersion liquid, and prepares a coloring particle distribution object is included. The fourth example of this approach includes the third process which mixes the second process which mixes this color solution and the liquid which contains water at least, and prepares color particle dispersion liquid, and said vinyl polymer solution and said color particle dispersion liquid, and prepares a coloring particle distribution object by preparing the first process which prepares the vinyl polymer solution which dissolved said vinyl polymer in the organic solvent, and the color solution which dissolved said oil color.

[0065] In said coloring particle distribution object, as amount of said oil solubility polymer (vinyl polymer) used, the 10 - 600 mass section is desirable to said oil color 100 mass section, and the 50 - 400 mass section is more desirable. When there is an inclination detailed and stable distribution stops easily being able to suppose that they are under 10 mass sections and the amount of said oil solubility polymer (vinyl polymer) used exceeds the 600 mass sections, the rate of said oil color in a coloring particle distribution object decreases, and when this coloring particle distribution object is used as drainage system ink, there is an inclination for the allowances on the design of mix to be lost.

[0066] - Organic solvent - as an organic solvent used in case said coloring particle distribution object is manufactured There is especially no limit and it can be suitably chosen based on the solubility of said oil color and said oil solubility polymer (vinyl polymer). For example, ketones, such as an acetone, a methyl ethyl ketone, and a diethyl ketone, A methanol, ethanol, 2-propanol, 1-propanol, 1-butanol, Chlorine-based solvents, such as alcohols solvents, such as a tert-butanol, chloroform, and a methylene chloride, Ester solvents, such as aromatic solvents, such as benzene and toluene, ethyl acetate, butyl acetate, and isopropyl acetate, Glycol ether system solvents, such as ethers solvents, such as diethylether, a tetrahydrofuran, and dioxane, ethylene glycol monomethyl ether, and ethylene glycol wood ether, etc. are mentioned. These organic solvents may be used by the one-sort independent, and may use two or more sorts together.

[0067] Although there will be especially no limit if it is within the limits which does not injure the effectiveness of this invention as amount of said organic solvent used, the 10 - 2000 mass section is desirable to said oil solubility polymer (vinyl polymer) 100 mass section, and the 100 - 1000 mass section is more desirable. When there is an inclination detailed and stable distribution of a coloring particle stops easily being able to suppose that they are under 10 mass sections and the amount of said organic solvent used exceeds the 2000 mass sections, there is an inclination for deliquoring for removing this organic solvent and the process of concentration to become indispensable, and for the allowances on the design of mix to be lost.

[0068] When the solubility to the water of this organic solvent is 10% or less, or when the vapor pressure of this organic solvent is larger than water, as for said organic solvent, it is desirable to be removed in respect of the stability of a coloring particle distribution object. It is desirable that ordinary pressure - reduced pressure conditions can perform removal of said organic solvent at 10 degrees C - 100 degrees C, and 40-100 degrees C or reduced pressure conditions perform at 10-50 degrees C by ordinary pressure conditions.

[0069] - The coloring particle distribution object of additive-this invention may contain the additive suitably chosen within limits which do not injure the effectiveness of this invention according to the purpose. As said additive, a neutralizer, a dispersant, a distributed stabilizer, etc. are mentioned, for example.

[0070] Said neutralizer can be suitably used in respect of pH accommodation of this coloring particle distribution object, self-emulsifiability accommodation, distributed stability grant, etc., when it has said dissociative radical said whose oil solubility polymer (vinyl polymer) is not neutralized. An organic base, inorganic alkali, etc. are mentioned as said neutralizer.

[0071] Triethanolamine, diethanolamine, N-methyldiethanolamine, dimethylethanolamine, etc. are mentioned as said organic base. As said inorganic alkali,

the hydroxides (for example, a sodium hydroxide, a lithium hydroxide, a potassium hydroxide, etc.) of alkali metal, carbonates (for example, a sodium carbonate, a sodium hydrogencarbonate, etc.), ammonia, etc. are mentioned. As for said neutralizer, it is desirable to add so that it may be set to pH 4.5-10.0 from a viewpoint which raises the distributed stability in a coloring particle distribution object, and it is more desirable to add so that it may be set to pH 6.0-10.0.

[0072] Although you may add to any, such as a vinyl polymer latex, a vinyl polymer solution, a color solution, and a solution that contains water at least, as for said dispersant and a distributed stabilizer, it is desirable to add in the vinyl polymer of the last process which prepares vinyl polymer and/or color particle dispersion liquid, a color solution, and the solution containing water. As said dispersant and a distributed stabilizer, \*\*s, such as a cation, an anion, various surfactants of the Nonion system, a water-soluble or water-dispersion low molecular weight compound, and oligomer, are mentioned. As an addition of said dispersant and a distributed stabilizer, it is zero to 100 mass % to the sum total of said oil color and said oil solubility polymer (vinyl polymer), and 0 - 20 mass % is desirable.

[0073] - Coloring particle - In said coloring particle, it is desirable that said oil color is distributed in said oil solubility polymer. As a content in the coloring particle distribution object of said coloring particle, 1 - 45 mass % is desirable, and 2 - 30 mass % is more desirable. Dilution, evaporation, an ultrafiltration, etc. can adjust said content suitably. As mean particle diameter of said coloring particle, 1-500nm is desirable, 3-300nm is more desirable, and especially 3-200nm is desirable. Centrifugal separation, filtration, etc. can adjust said mean particle diameter.

[0074] - although the coloring particle distribution object of application-this invention of a coloring particle distribution object can be used in various fields -- a note -- service water -- it is suitable for sex ink, aquosity printing ink, the ink for information record, etc., and can be especially used for the ink for ink jets of the following this inventions suitably.

[0075] said coloring particle distribution object -- a note -- service water -- although there is especially no limit and a well-known ingredient is mentioned as a recorded material of this ink when using it as ink, such as sex ink, aquosity printing ink, and ink for information record, a regular paper, resin coat paper, the paper only for ink jets, a film, electrophotography common paper, a textile, glass, a metal, pottery, etc. are mentioned, for example.

[0076] (The ink for ink jets, and the ink JIETO record approach) The ink for ink jets of this invention comes to contain the component of others which came to contain the coloring particle distribution object of said this invention, and were chosen further suitably if needed. In the ink jet record approach of this invention, although recorded using the ink for ink jets of said this invention, there is especially no limit about the ink nozzle used in that case, and it can choose suitably according to the purpose.

[0077] - Other components - The component of said others is contained within limits which do not injure the effectiveness of this invention. As a component of said others, well-known additives, such as a desiccation inhibitor, an osmosis accelerator, an ultraviolet ray absorbent, an antioxidant, an antifungal agent, pH regulator, a surface tension regulator, a defoaming agent, a viscosity controlling agent, a dispersant, a distributed stabilizer, a rusr-proofer, and a chelating agent, are mentioned, for example.

[0078] Said desiccation inhibitor is suitably used in order to prevent the blinding by this ink for ink jets \*\*\*\*(ing) in the ink injection tip of the nozzle used for an ink jet recording method.

[0079] As said desiccation inhibitor, a water-soluble organic solvent with vapor pressure lower than water is desirable. As an example Ethylene glycol, propylene glycol, a diethylene glycol, A polyethylene glycol, thioglycol, dithio diethylene glycol, 2-methyl-1,3-propanediol, 1 and 2, 6-hexane triol, The polyhydric alcohol represented by an acetylene glycol derivative, a glycerol, trimethylol propane, etc. The ethylene glycol monomethyl (or ethyl) ether, the diethylene-glycol monomethyl (or ethyl) ether, The low-grade alkyl ether of polyhydric alcohol, such as the triethylene glycol monoethyl (or butyl) ether 2-pyrrolidone, a N-methyl-2-pyrrolidone, 1,3-dimethyl-2-imidazolidinone, Multifunctional compounds, such as sulphur-containing compounds, such as heterocycles, such as N-ethyl morpholine, a sulfolane, dimethyl sulfoxide, and 3-SURUHOREN, diacetone alcohol, and diethanolamine, and urea derivative \*\* are mentioned. Also in these, polyhydric alcohol, such as a glycerol and a diethylene glycol, is more desirable. These desiccation inhibitors may be used by the one-sort independent, and may use two or more sorts together. As a content in said ink for ink jets of said desiccation inhibitor, 10 - 50 mass % is desirable.

[0080] Said osmosis accelerator is used suitably the making the ink for ink jets permeate well in paper purpose.

[0081] As said osmosis accelerator, alcohols, such as ethanol, isopropanol, butanol, JI (Tori) ethylene-glycol-monobutyl-ether, 1, and 2-hexandiol, sodium lauryl sulfate and sodium oleate, the Nonion nature surfactant, etc. are mentioned, for example. Said osmosis accelerator is contained within limits which do not produce a blot of printing, a paper omission (print through), etc., and if 5-30 mass % extent content is carried out into the ink for ink jets, usually sufficient effectiveness will be demonstrated.

[0082] Said ultraviolet ray absorbent is used in order to raise the shelf life of an image. As said ultraviolet ray absorbent, for example JP,58-185677,A, A 61-190537 official report, JP,2-782,A, a 5-197075 official report, The benzotriazol system compound indicated by the 9-34057 official report etc., The benzophenone system compound indicated by JP,46-2784,A, JP,5-194483,A, U.S. Pat. No. 3214463, etc., The cinnamic acid system compound indicated by JP,48-30492,B, a 56-21141 official report, JP,10-88106,A, etc., JP,4-298503,A, a 8-53427 official report, a 8-239368 official report, The triazine compound indicated by the 10-182621 official report, the Patent Publication Heisei No. 501291 [ eight to ] official report, etc., The compound which absorbs the ultraviolet rays represented by the compound indicated by research disclosure No.24239 No., and a stilbene system and a benzoxazole system compound, and emits fluorescence, the so-called fluorescent brightener, etc. are mentioned.

[0083] Said antioxidant is used in order to raise the shelf life of an image. As said antioxidant, the tenebrescence inhibitor of various kinds of organic systems and a metal complex system can be used, for example. As a tenebrescence inhibitor of said organic system, hydroquinone, alkoxy phenols, dialkoxy phenols, phenols, aniline, amines, indans, chromans, alkoxy aniline, and heterocycles are mentioned. A nickel complex, a zinc complex, etc. are mentioned as a tenebrescence inhibitor of said metal complex system. Specifically the [ of research disclosure No.17643 ] -- the I-J term of VII -- said - - No.15162 -- said -- the 650-page left column of No.18716 -- said -- No.36544 527

pages said -- 872 pages of No.307105 -- said -- the compound indicated by the patent quoted by No.15162 and the compound contained in the general formula and the example of a compound of a typical compound which were indicated by 127 pages - 137 pages of JP,62-215272,A can be used.

[0084] As said antifungal agent, sodium-dehydroacetate, sodium benzoate, sodium pyridine thione-1-oxide, ethyl-p-hydroxybenzoate ester, 1, and 2-bends iso thiazoline-3-ON, its salt, etc. are mentioned. As for these, it is desirable to do 0.02-1.00 mass % use of into ink.

[0085] As said pH regulator, said neutralizer (an organic base, inorganic alkali) can be used. It is the purpose which raises the preservation stability of the ink for ink jets, as for said pH regulator, it is desirable that this ink for ink jets adds for pH 6-10 and summer, and it is more desirable to add so that it may be set to pH 7-10.

[0086] As said surface-tension regulator, Nonion, a cation, or an anionic surface active agent is mentioned. In addition, as surface tension of the ink for ink jets of this invention, 25 - 70 mPa-s is desirable, and 25 - 60 mPa-s is more desirable. Moreover, as viscosity of the ink for ink jets of this invention, 30 or less mPa-s is desirable, and 20 or less mPa-s is more desirable.

[0087] As said defoaming agent, the \*\*\*\* chelating agent represented by a fluorine system, a silicone system compound, and EDTA can be used if needed.

[0088] The ink for ink jets of this invention can carry out printing etc. suitable for a well-known recorded material. As said recorded material, although there is especially no limit, the paper only for ink jets is desirable. As paper only for said ink jets, what is indicated by JP,8-169172,A, a 8-27693 official report, a 2-276670 official report, a 7-276789 official report, a 9-323475 official report, JP,62-238783,A, JP,10-153989,A, a 10-217473 official report, the 10-235995 official report, the 10-337947 official report, the 10-217597 official report, the 10-337947 official report, etc. is mentioned, for example.

[0089] Moreover, in this invention, the following recording papers and recording films are suitably used outside the paper only for said ink jets as said recorded material. Said recording paper and recording film come to carry out the laminating of a base material and the ink absorbing layer, and come to carry out the laminating also of the layer of others, such as a back coat layer, if needed. In addition, the number of each class including an ink absorbing layer may be one, respectively, and it may be more than two-layer.

[0090] As said base material, what consists of recycled pulp, such as mechanical pulp, such as chemical pulp, such as LBKP and NBKP, GP, PGW, RMP and TMP, CTMP, and CMP, corrosion gage point, and DIP, etc. is mentioned. Addition mixing of the conventional well-known pigment, a binder, a sizing compound, a fixing agent, a cation agent, the paper reinforcing agent, etc. may be carried out at said pulp if needed. SE formation of the base material can be carried out in the first half using various equipments, such as a Fortlinear paper machine and a cylinder machine. As said base material, you may be a synthetic paper, a plastic film sheet, etc. further.

[0091] As thickness of said base material, it is about 10-250 micrometers, and 10 - 250 g/m<sup>2</sup> of a basis weight is desirable.

[0092] The direct laminating of said back coat layer which chose said ink absorbing layer if needed further may be carried out to said base material, and after preparing size press and an anchor coat layer with starch, polyvinyl alcohol, etc., said ink absorbing layer and

said back coat layer may be prepared. Moreover, calender equipments, such as a machine calender, TG calender, and a software calender, may perform flattening processing to said base material.

[0093] Also in said base material, the paper which laminated both sides with polyolefine (an example, polyethylene, polystyrene, polyethylene terephthalate, polybutenes, and those copolymers), and plastic film are desirable, and it is more desirable that white pigments (an example, titanium oxide, zinc oxide) or a tint attachment color (an example, cobalt blue, ultramarine blue, oxidization neodium) is added in said polyolefine.

[0094] Said ink absorbing layer contains a pigment, an aquosity binder, a mordant, a deck-watertight-luminaire-ized agent, a light-fast improver, a surfactant, and other additives.

[0095] As said pigment, white pigments are desirable. As said white pigments, organic pigments, such as inorganic white pigments, such as a calcium carbonate, a kaolin, talc, clay, diatomaceous earth, synthetic amorphous silica, aluminum silicate, a magnesium silicate, a calcium silicate, an aluminum hydroxide, an alumina, a lithopone, a zeolite, a barium sulfate, a calcium sulfate, a titanium dioxide, zinc sulfide, and zinc carbonate, a styrene system pigment, an acrylic pigment, a urea-resin, and melamine resin, etc. are mentioned, for example. Also in these, a porous inorganic pigment is desirable and especially synthetic amorphous silica with a large pore area etc. is desirable. Although both the silicic anhydride obtained according to a dry process and the water silicic acid of said synthetic amorphous silica obtained according to wet process are usable, especially water silicic acid is desirable.

[0096] As said aquosity binder, water-dispersion macromolecules, such as water soluble polymers, such as polyvinyl alcohol, silanol denaturation polyvinyl alcohol, starch, cation-ized starch, casein, gelatin, a carboxymethyl cellulose, hydroxyethyl cellulose, a polyvinyl pyrrolidone, polyalkylene oxide, and a polyalkylene oxide derivative, a styrene butadiene latex, and an acrylic emulsion, etc. are mentioned, for example. These may be used by the one-sort independent and may use two or more sorts together. Also in these, polyvinyl alcohol and silanol denaturation polyvinyl alcohol are desirable in respect of the adhesion over said pigment, and the peeling resistance of an ink absorbing layer.

[0097] As said mordant, immobilizing is desirable and, for that purpose, a polymer mordant is desirable. As said polymer mordant, JP,48-28325,A, 54-74430, 54-124726, 55-22766, 55-142339, 60-23850, 60-23851, 60-23852, 60-23853, 60-57836, 60-60643, 60-118834, 60-122940, 60-122941, Each official report of 60-122942, 60-235134, and JP,1-161236,A, a U.S. Pat. No. 2484430 number -- said -- No. 2548564 -- said -- No. 3148061 -- said -- No. 3309690 -- said -- No. 4115124 -- said -- No. 4124386 -- said -- No. 4193800 -- said -- No. 4273853 -- said -- No. 4282305 -- said -- each specification of No. 4450224 has a publication. The polymer mordant of a 212-215-page publication of JP,1-161236,A is mentioned suitably. When these polymer mordants are used, it is desirable at the point that the image of the outstanding image quality is obtained and the lightfastness of an image is improved.

[0098] Said deck-watertight-luminaire-ized agent is used the making an image deck-watertight-luminaire-ize purpose. As said deck-watertight-luminaire-ized agent, cation resin is desirable. As said cation resin, polyamide polyamine epichlorohydrin, polyethyleneimine, a polyamine sulfone, a dimethyl diaryl ammoniumchloride polymerization object, cation polyacrylamide, colloidal silica, etc. are mentioned, for

example. Also in these cation resin, especially polyamide polyamine epichlorohydrin is desirable. As a content of said cation resin, 1 - 15 mass % is desirable to the total solids of said ink absorbing layer, and 3 - 10 mass % is more desirable.

[0099] As said light-fast improver, the ultraviolet ray absorbent of benzotriazol systems, such as a zinc sulfate, a zinc oxide, a HINDA amine system anti-oxidant, and a benzophenone, etc. is mentioned, for example. Also in these, especially a zinc sulfate is desirable.

[0100] Said surface active agent functions as a spreading assistant, a detachability amelioration agent, a slide nature amelioration agent, or an antistatic agent. As said surfactant, what was indicated by each official report of JP,62-173463,A and 62-183457 is mentioned. In addition, an organic fluoro compound may be used instead of said surfactant. As for said organic fluoro compound, it is desirable that it is hydrophobicity. As said organic fluoro compound, a fluorochemical surfactant, an oil-like fluorine system compound (an example, fluorine oil), and solid-state-like fluorine compound resin (an example, tetrafluoroethylene resin) are contained, and what was indicated by each official report of JP,57-9053,B (the 8-17th columns), JP,61-20994,A, and 62-135826 is mentioned, for example.

[0101] As an additive of said others, a pigment agent, a thickener, a defoaming agent, a color, a fluorescent brightener, antiseptics, pH regulator, a mat agent, a hardening agent, etc. are mentioned, for example.

[0102] Said back coat layer contains the component of white pigments, an aquosity binder, and others.

[0103] As said white pigments, for example Precipitated calcium carbonate, whiting, A kaolin, talc, a calcium sulfate, a barium sulfate, a titanium dioxide, A zinc oxide, zinc sulfide, zinc carbonate, a satin white, aluminum silicate, The diatom earth, a calcium silicate, a magnesium silicate, synthetic amorphous silica, Colloidal silica, a colloidal alumina, pseudo-boehmite, an aluminum hydroxide, An alumina, a lithopone, a zeolite, hydrated halloysite, a magnesium carbonate, Organic pigments, such as white inorganic pigments, such as a magnesium hydroxide, a styrene system plastics pigment, an acrylic plastics pigment, polyethylene, a microcapsule, a urea-resin, and melamine resin, etc. are mentioned.

[0104] As said aquosity binder, water-dispersion macromolecules, such as water soluble polymers, such as styrene / maleate copolymer, styrene / acrylate copolymer, polyvinyl alcohol, silanol denaturation polyvinyl alcohol, starch, cation-ized starch, casein, gelatin, a carboxymethyl cellulose, hydroxyethyl cellulose, and a polyvinyl pyrrolidone, a styrene butadiene latex, and an acrylic emulsion, etc. are mentioned.

[0105] As a component of said others, a defoaming agent, foam suppressor, a color, a fluorescent brightener, antiseptics, a deck-watertight-luminaire-ized agent, etc. are mentioned.

[0106] In addition, polymeric latex may be added by each class in said recording paper and recording film. Said polymeric latex is used for the purpose of film physical-properties amelioration like dimension stabilization, curl prevention, adhesion prevention, and crack prevention of the film. As said polymeric latex, what was indicated by each official report of JP,62-245258,A, 62-1316648, and 62-110066 is mentioned. If polymeric latex (40 degrees C or less) with a low glass transition temperature is added in the layer containing said mordant, the crack and curl of this layer can be prevented.

Moreover, curl can be prevented if polymeric latex with a high glass transition temperature is added in said back coat layer.

[0107] The ink for ink jets of this invention is applicable to any ink jet recording methods. For example, the charge control system which makes ink breathe out using the electrostatic invitation force, the drop method using the oscillating pressure of a piezo-electric element on demand (pressure pulse method), It is used suitable for the thermal ink jet (bubble jet) method which heats the sound ink jet method and ink which an electrical signal is changed [ ink ] into a sound beam, and ink is irradiated [ ink ], and make ink breathe out using radiation pressure, forms air bubbles, and uses the produced pressure. In addition, the method which injects much ink with low concentration called photograph ink by the small volume, the method which improves image quality using two or more ink in which concentration differs by the same hue substantially, and the method using transparent and colorless ink are contained in said ink jet recording method.

[0108]

[Example] Hereafter, although the example of this invention is explained, this invention is not limited to these examples at all. In addition, below, as long as there is no notice, the "mass section" and "mass %" are expressed especially the "section" and "%."

[0109] The mixed liquor which consists of the <synthetic example 1 (composition of vinyl polymer P-33)> n-butyl methacrylate 37.5 section, 1H, 1H and 2H, and 2H-perfluoro decyl acrylate 10.0 section and the acrylic-acid 2.5 section was prepared. Next, after carrying out a temperature up to 80 degrees C, teaching the isopropyl alcohol 40 section, the dichloroethane 60 section and dimethyl 2, and the 2'-azobis (2-methyl propionate) 0.25 section to a flask, and stirring under a N2 seal, said mixed liquor was dropped over 2 hours, and dimethyl 2 and 2'-azobis (2-methyl propionate) were made to react at this temperature further 0.05 \*\*\*\*\*s after dropping termination for 5 hours. Target vinyl polymer was obtained by the above. The content of the dissociative radical was 0.69 mmol/g, the molecular weight (Mw) of the obtained vinyl polymer was 61000, and the solid content of the solution was 35%. Hereafter, the solution of this vinyl polymer is written as a vinyl polymer solution (A-1).

[0110] <Synthetic example 2 (composition of vinyl polymer P-27)> In said synthetic example 1, it was made to be the same as that of said synthetic example 1 except having used the mixed liquor which consists of the ethyl methacrylate 47.5 section, the dodecyl mercaptan 0.4 section, and the acrylic-acid 2.5 section instead of the butyl methacrylate 37.5 section, 1H, 1H and 2H, and 2H-perfluoro decyl acrylate 10.0 section and the acrylic-acid 2.5 section. The content of the dissociative radical was 0.69 mmol/g, the molecular weight (Mw) of the obtained vinyl polymer was 24000, and the solid content of the solution was 34%. Hereafter, this vinyl polymer solution is written as a vinyl polymer solution (A-2).

[0111] The mixed liquor which consists of the <synthetic example 3 (composition of vinyl polymer P-34)> methyl methacrylate 23.8 section, the n-butyl acrylate 23.8 section, and the acrylic-acid 2.5 section was prepared. Next, after carrying out a temperature up to 80 degrees C, teaching the isopropyl alcohol 100 section, dimethyl 2, and the 2'-azobis (2-methyl propionate) 0.25 section to a flask, and stirring under a N2 seal, said mixed liquor was dropped over 2 hours, and dimethyl 2 and 2'-azobis (2-methyl propionate) were made to react at this temperature further 0.05 \*\*\*\*\*s after dropping termination for 10 hours. Target vinyl polymer was obtained by the above. The content of the

dissociative radical was 0.68 mmol/g, the molecular weight (Mw) of the obtained vinyl polymer was 42000, and the solid content of the solution was 36%. Hereafter, this vinyl polymer solution is written as a vinyl polymer solution (A-3).

[0112] The mixed liquor which consists of the <synthetic example 4 (composition of vinyl polymer P-86)> ethyl methacrylate 72.3 section, the 2-acrylamido-2-methyl-propane-sulfonic-acid soda 7.7 section, the water 25 section, and the isopropyl alcohol 70 section was prepared. Next, after carrying out a temperature up to 80 degrees C, teaching the isopropyl alcohol 20 section and dimethyl 2, and the 2'-azobis (2-methyl propionate) 0.4 section to a flask, and stirring under a N2 seal, said mixed liquor was dropped over 3 hours, and dimethyl 2 and 2'-azobis (2-methyl propionate) were made to react at this temperature further 0.2 \*\*\*\*\*s after dropping termination for 8 hours. Target vinyl polymer was obtained by the above. The content of the dissociative radical was 0.42 mmol/g, the molecular weight (Mw) of the obtained vinyl polymer was 56000, and the solid content of the solution was 47%. Hereafter, this vinyl polymer solution is written as a vinyl polymer solution (A-4).

[0113] The water 50 section was added stirring, after adding the 2 mol/L sodium-hydroxide 2.3 section to the mixed liquor of the <example 1 (preparation of coloring particle distribution object (B-1)) of manufacture> isopropyl alcohol 4 section, the tert-butanol 6 section, said vinyl polymer solution (A-1) 9.1 section, and said oil color (I-1) 0.8 section gradually, and carrying out a temperature up to 80 degrees C. This liquid was condensed at 40 degrees C under reduced pressure, and the coloring particle distribution object of 20% of solid content was prepared. The particle size of the coloring particle in this coloring particle distribution object was 42nm in the volume mean diameter (micro truck UPA150; it measures by the Nikkiso [ Co., Ltd. ] Co., Ltd. make). Hereafter, this is written as a coloring particle distribution object (B-1).

[0114] The water 50 section was added stirring, after adding the 2-N sodium-hydroxide 2.3 section to the mixed liquor of the <example 2 (preparation of coloring particle distribution object (B-2)) of manufacture> isopropyl alcohol 4 section, the tetrahydrofuran 6 section, said vinyl polymer solution (A-2) 9.4 section, and said oil color (I-6) 0.8 section gradually, and carrying out a temperature up to 70 degrees C. This liquid was condensed at 40 degrees C under reduced pressure, and the coloring particle distribution object of 20% of solid content was prepared. The particle size of the coloring particle in this coloring particle distribution object was 37nm in the volume mean diameter. Hereafter, this is written as a coloring particle distribution object (B-2).

[0115] The water 45 section was added stirring, after adding the 1-N sodium-hydrogencarbonate 1.9 section to the mixed liquor of the <example 3 (preparation of coloring particle distribution object (B-3)) of manufacture> tert-butanol 10 section, said vinyl polymer solution (A-3) 7.8 section, and said oil color (I-8) 1.2 section gradually, and carrying out a temperature up to 75 degrees C. This liquid was condensed at 40 degrees C under reduced pressure, and the coloring particle distribution object of 20% of solid content was prepared. The particle size of the coloring particle in this coloring particle distribution object was 52nm in the volume mean diameter. Hereafter, this is written as a coloring particle distribution object (B-3).

[0116] The water 45 section was added stirring it, after carrying out the temperature up of the mixed liquor of the <example 4 (preparation of coloring particle dispersion liquid (B-4)) of manufacture> tert-butanol 8 section, the 2-butanone 2 section, said vinyl polymer

solution (A-4) 6.0 section, and said oil color (I-16) 1.2 section to 75 degrees C. This liquid was condensed at 40 degrees C under reduced pressure, and the coloring particle distribution object of 20% of solid content was prepared. The particle size of the coloring particle in this \*\*\*\* particle distribution object was 83nm in the volume mean diameter. Hereafter, this is written as a coloring particle distribution object (B-4).

[0117] (Example 1) In the coloring particle distribution object (B-1) 62 section prepared in said example 1 of manufacture, the diethylene-glycol 10 section, the glycerol 8 section, the triethylene glycol monobutyl ether 8 section, the 25% water-solution (Kao Corp. make; EMARU 20C) 4 section of a surfactant, and the ion-exchange-water 8 section were mixed, it filtered with the 0.2-micrometer filter in it, and the water ink for ink jets was prepared in it.

[0118] (Example 2) In said example 1, the ink for ink jets was prepared like said example 1 except having replaced with the coloring particle distribution object (B-2) which prepared said coloring particle distribution object (B-1) in said example 2 of manufacture.

[0119] (Example 3) In the coloring particle distribution object (B-3) 42 section prepared in said example 3 of manufacture, the diethylene-glycol 10 section, the glycerol 8 section, the triethylene glycol monobutyl ether 8 section, the 25% water-solution (Kao Corp. make; EMARU 20C) 4 section of a surfactant, and the ion-exchange-water 28 section were mixed, it filtered with the 0.2-micrometer filter in it, and the ink for ink jets was prepared in it.

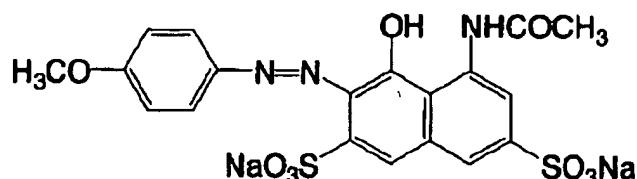
[0120] (Example 4) In said example 3, the ink for ink jets was prepared like said example 3 except having replaced with the coloring particle distribution object (B-4) which adjusted said coloring particle distribution object (B-3) in said example 5 of manufacture.

[0121] (Example 1 of a comparison) In the following comparison coloring matter (H-2) 4 section, the diethylene-glycol 10 section, the glycerol 8 section, the tetraethylene glycol monobutyl ether 10 section, the diethanolamine 1 section, and the ion-exchange-water 67 section were mixed, it filtered with the 0.2-micrometer filter in it, and the ink for ink jets was prepared in it.

[0122]

[Formula 14]

化合物H-1



[0123] (Image recording and evaluation) The following evaluation was performed about the ink for ink jets of each above example and the example of a comparison. The result was shown in Table 1. In addition, in Table 1, a "color tone", a "paper dependency", a "water resisting property", and "lightfastness" evaluate each ink for ink jets, after recording an image on photograph glossy paper (Fuji Photo Film Co., Ltd. make; an ink jet paper, photograph grade) with an ink jet printer (the product made from EPSON-M-700C).

[0124] <Color tone> Viewing estimated said recorded image in two steps, A (good) and

B (defect).

[0125] <Paper dependency> The color tone of the image formed in said photograph glossy paper and the image separately formed in the regular paper for PPC was compared, and the case where the difference between both images was small was evaluated in two steps, having used as B (defect) the case where the difference between A (good) and both images was large.

[0126] <Water resisting property> After carrying out room temperature desiccation of the photograph glossy paper in which said image was formed for 1 hour, it was immersed in water for 30 seconds, and was made to season naturally at a room temperature, and the blot was observed. That from which A and a blot produced the thing without a blot slightly was evaluated in three steps by setting to C B and what has many blots.

[0127] <Lightfastness> The weather meter (atlas C.I65) was used for the photograph glossy paper in which said image was formed, xenon light (85000lx) was irradiated for three days, the image concentration before and behind a xenon exposure was measured using the reflection density meter (X-Rite310TR), and it evaluated as a coloring matter survival rate. In addition, said reflection density was measured by three points, 1, 1.5, and 2.0. A, 1, or two points evaluated by any concentration the case where a coloring matter survival rate was 70% or more, by setting less than 70% of case to C by B and all concentration for less than 70% in three steps.

[0128]

[Table 1]

No.	色調	紙依存性	耐水性	耐光性
実施例1	A	A	A	A
実施例2	A	A	A	A
実施例3	A	A	A	A
実施例4	A	A	A	A
比較例1	B	B	C	C

[0129] The ink for ink jets of this invention was excellent in color enhancement and a color tone, does not have a paper dependency and was excellent in a water resisting property and lightfastness so that clearly from Table 1.

[0130]

[Effect of the Invention] According to this invention, can solve many problems in said former and it excels in the distributed stability of a coloring particle. There is no paper dependency and it excels in the color enhancement and the color tone at the time of printing on the paper chosen as arbitration. and a water resisting property and lightfastness -- excelling -- a note -- service water -- sex ink and aquosity printing ink -- In the suitable coloring particle distribution object for the ink for information record etc., and a list, thermal \*\* When it is suitable for piezo-electricity, electric field, or a sound ink jet method and printing etc. is performed using a nozzle etc., The ink for ink jets and the ink jet record approach of not starting blinding at this nozzle tip, and there being no paper dependency, and excelling in the color enhancement and the color tone at the time of printing on the paper chosen as arbitration, and excelling also in a water resisting property and lightfastness can be offered.